



KVL 3000™

Key Variable Loader



User's Guide

68P81131E16-O



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IMPORTANT!
Read this information before operating your KVL 3000

Depending on the options ordered, the *KVL 3000* Key Variable Loader has the capability of being configured to operate in ASN (Advanced Securenet) mode or *ASTRO 25* mode. KVL 3000s ordered with only Option X795 operate in ASN mode only. *KVL 3000*s ordered with Option X795 and Option U239 can operate in ASN or *ASTRO 25* mode (menu selectable). The *KVL 3000* menu system, functionality, and operating characteristics are different depending on which operating mode is active (essentially two products in one package).

This manual is designed and organized to account for the two operating modes. The following illustration explains how to read this manual for both ASN and *ASTRO 25* operating modes.

This section applies to both ASN and *ASTRO 25*. Follow the instructions in these chapters before operating your *KVL 3000*.

**GETTING
STARTED**

Chapter 1. Controls and Indicators
Chapter 2. Preparing the KVL 3000 for Use

When operating your *KVL 3000* in ASN mode, follow the instructions in these chapters to perform all tasks.

**ASN
OPERATION**

Chapter 1. Quick Start Instructions
Chapter 2. Overview
Chapter 3. Performing Initial Programming
Chapter 4. Entering and Loading Keys
Chapter 5. Sharing Keys Between KVLs
Chapter 6. Using KVL 3000 in OTAR Systems
Chapter 7. Viewing and Printing Log Records
Chapter 8. Troubleshooting

When operating your *KVL 3000* in *ASTRO 25* mode, follow the instructions in these chapters to perform all tasks.

**ASTRO 25
OPERATION**

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Chapter 2. Overview
Chapter 3. Performing Initial Programming
Chapter 4. Entering Keys into KVL 3000
Chapter 5. Loading Keys into Target Devices
Chapter 6. Sharing Keys Between KVLs
Chapter 7. Using KVL 3000 in OTAR Systems
Chapter 8. Viewing and Printing Log Records
Chapter 9. Troubleshooting

This section describes tasks that involve both ASN and *ASTRO 25* modes.

MIGRATION

Chapter 1. Using the Key Porting Feature
Chapter 2. Switching Between ASN / *ASTRO 25*

This section provides general reference information that applies to both ASN and *ASTRO 25* modes.

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Purpose of Manual

This manual provides step-by-step instructions for using the *KVL 3000* Key Variable Loader to create and store encryption keys, and then load these encryption keys into other Motorola secure equipment, such as radios, fixed encryption units, etc.

Target Audience

This manual is intended for use by experienced technicians familiar with similar types of equipment. Technicians should understand encryption concepts and be familiar with other types of Motorola encryption equipment.

Related Manuals

The following manuals may be required to supplement the information contained in this manual:

- *KVL 3000 Service Manual* — 68P80800B85
- *KVL 3000 Firmware Upgrade Manual*— 68P81130E26

Organization of this Manual

This manual is a combination of descriptive information and procedural instructions; these instructions describe the various tasks associated with entering and loading encryption keys.

The manual is divided into chapters, each of which begins with a contents page, followed by a group of descriptive or task-oriented topics. Each topic contains all the information necessary to perform tasks or describe concepts. Typical examples, illustrations of *KVL 3000* displays, and step-by-step procedures are provided to make this manual easy to follow and understand.

Refer to the “Important Read Me” page in front of the Table of Contents for more information about the organization of this manual.

Error and Concerns Reporting

Any errors or concerns about this manual or its contents should be addressed to *KVL 3000 Brand Manager* and faxed to 1 -847-538-2770. Please be sure to add your name and phone number so we can follow up with you.

Chapter 1

Controls and Indicators

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Controls and Indicators



- ❶ **Display** — Provides 4-line, 12-character (4 x 12) LCD display to show menus, key entries, status indicators, and other user data
- ❷ **Esc Key** — Press to return to the previous menu or press to abort any operation in progress
- ❸ **Arrow Keys** — Press right and left arrow keys to navigate through menus and lists
- ❹ **Enter Key** — Press to complete an input
- ❺ **Pwr Key** — Press to turn the *KVL 3000* on and off
- ❻ **Keypad** — Use these keys to enter encryption keys and other data into the *KVL 3000*
- ❼ **Del/Shift Key** — Use this dual purpose key to **a)** delete one character at a time during input mode, **b)** delete individual items, such as keys or Key Groups (ASTRO 25 only), and **c)** combine with another key to perform special functions as shown below. (Press and hold **Shift** key, then press combined key.)

Shift + B	Toggles display backlighting on and off
Shift + C	Displays KVL's serial number and currently running software version
Shift + D (ASN Only)	While browsing through traffic or shadow keys, deletes currently displayed key
Shift + E (ASN Only)	Displays text describing most recent error status for an attempted key load
Shift + 0 (ASN Only)	Used to enter zeroize mode to zeroize traffic and shadow keys in target devices
Shift + Enter	Initiates a reset

- ❽ **Softkeys** — Use these keys to select choices shown on left and right side of bottom line in LCD display

Input/Output Ports

The input/output ports for the *KVL 3000* are shown below.



Status Indicators

The following status indicators appear in the top row of the *KVL 3000* display.



Indicates low charge on Main Battery; charge immediately



Indicates valid modem card is inserted into PCMCIA port (top of *KVL 3000*)



Indicates *KVL 3000* modem attempting to connect to KMC (or KMF) modem



Indicates *KVL 3000* modem and KMC (or KMF) modem are communicating



Indicates key transfer in progress (for ASTRO 25 operation, icon appears for all operations involving a target device)



Indicates speaker sound has been turned off (using Config Menu)



Indicates tamper detect



Indicates capacity of log file; one bar indicates 75% full, progressing up to six bars for 100% full (128 entries)



Indicates software upgrade is being downloaded from PCMCIA card

Notes...

Chapter 2

Preparing the *KVL 3000* for Use

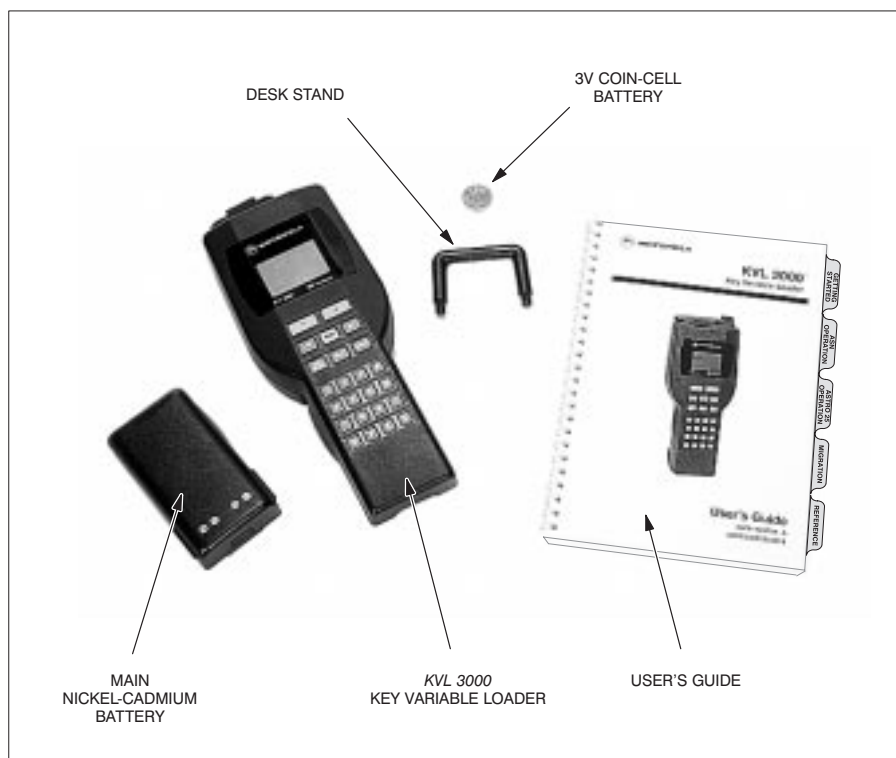
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Unpack and Take Inventory

Open the box, remove the foam cover, and remove the items as shown. Perform a quick inventory to make sure all items are present.

Important! After unpacking the items, immediately inspect the equipment for any visual damage and report the extent of any damage to the transportation company.

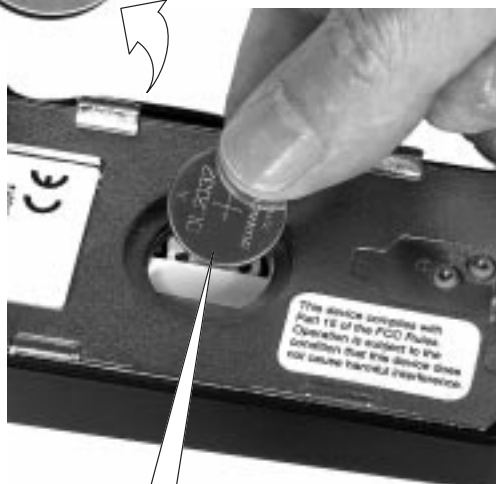
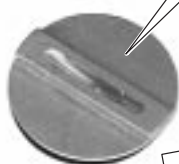


Install the Coin-Cell Battery

The KVL 3000 requires a 3 V coin-cell battery (supplied) to maintain date and time when the Main Battery is removed (or dead). Install the battery as shown below.

1

Using a coin or flat-bladed screwdriver, remove the battery cover.



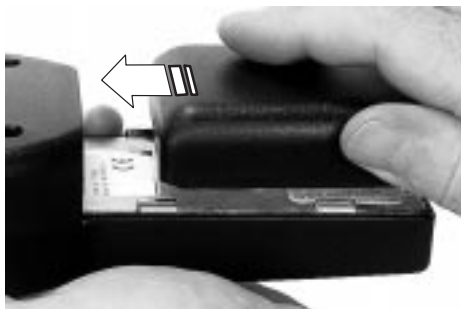
2

Insert the coin-cell battery with the positive (+) side up into the recess and snap into place. Replace the battery cover.

Charge and Install the Main Battery

The *KVL 3000* main power is provided by a 7.5 V nickel cadmium rechargeable battery (supplied). This battery must be charged overnight before its initial use with the *KVL 3000*. A variety of chargers are available from Motorola (see Appendix D). Charge the battery according to the instructions provided with the charger. Then, install the battery as shown below.

- 1 To install battery**, line up battery with metal rails, then slide forward and push until battery snaps into place.



- 2 To remove battery**, push up on release tab and slide battery towards rear of KVL.



Applying Power

Once the main battery is fully charged and attached to the *KVL 3000*, press the **Pwr** button to turn the unit on. The following will happen:

- All status indicator icons will display,
- **SELF TEST** will appear. This indicates that the *KVL 3000* is performing an internal self test routine to ensure that the unit is operating properly.
- The *Main Menu* screen for *ASTRO 25* operation will appear (shown below). The *KVL 3000* is now ready for use.

Note The *KVL 3000* is shipped from the factory to power up in *ASTRO 25* mode. You may switch to *ASN* mode as described in *Chapter 2 Switching Between ASN / ASTRO 25* behind the **MIGRATION** tab. The mode in which your *KVL 3000* is operating when powering off determines the mode in which it will operate when applying power. For example, if the *KVL 3000* is in *ASTRO 25* mode when powering off, the *KVL 3000* will power up in *ASTRO 25* mode when the unit is turned back on.

Note If the *KVL 3000* is purchased without the *ASTRO 25* option, the unit will always power up in *ASN* mode.



Using the Desktop Stand

The *KVL 3000* is shipped with a desktop stand that can be attached to the *KVL 3000*. This stand allows the keyloading cable to be routed down and away from the *KVL 3000* so that the *KVL 3000* can remain upright and stable while sitting on a desktop surface. Install the stand as shown below.

- 1 Squeeze in on sides of stand to line up with holes on back of the *KVL 3000*, then push into place.



- 2 The *KVL 3000* may now be placed on a desktop or other flat surface, allowing the keyloading cable to be routed to the target device.



Chapter 1

Quick Start Instructions

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About these Quick Start Instructions

For those of you who are already familiar with the *KVL 3000*, these *Quick Start Instructions* provide an abbreviated procedure for preparing your *KVL 3000* for use and entering and loading a single encryption key from the *KVL 3000* to a target device.

These *Quick Start Instructions* describe only the most basic scenario of entering and loading a key. Refer to the appropriate chapters in this manual for detailed step-by-step procedures required for special cases (such as using the *KVL 3000* with devices in OTAR systems, or entering and loading keys requiring LIDs).

We also encourage you to read the rest of this manual to learn how to make the most efficient use of the many features provided by the *KVL 3000* (such as using passwords, retrieving log records, using group maps, transferring keys between *KVL 3000*s, and configuring user-defined settings).

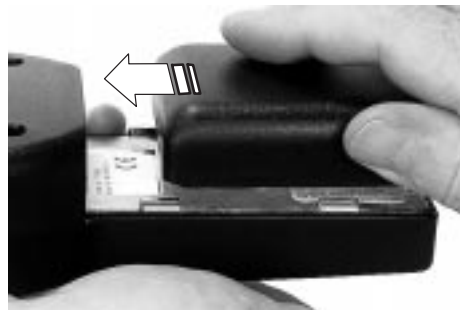
Quick Start Procedures

Note Steps 1 and 2 need be performed only once. Steps 3 thru 5 are performed on a per key basis.

1. Install the coin-cell battery (Chapter 2, behind *Getting Started* tab).



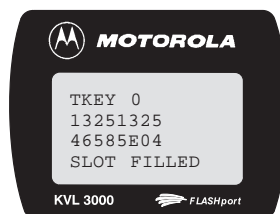
2. Charge and install the rechargeable main battery (Chapter 2, behind *Getting Started* tab).



— continued on next page —

Quick Start Procedures

3. Enter an encryption key into the *KVL 3000* memory (Chapter 4, within this tab).



4. Connect the *KVL 3000* to a target device (e.g., radio).



5. Transfer (load) the key to the target device (Chapter 4, within this tab).



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Description of KVL 3000

The *KVL 3000* Key Variable Loader is a battery-powered portable unit used to create, store, and transfer encryption keys used by Motorola's secure communications products (e.g., radios, DIUs, CIUs, RNCs, etc.). The *KVL 3000* (shown below) is comprised of a keypad, a 4-line, 12-character Liquid Crystal Display (LCD), multiple I/O ports for connecting to external equipment, a rechargeable battery, and sophisticated internal electronics and software.



KVL 3000 Key Variable Loader

Key Features

The *KVL 3000* offers the following features:

- Password Protection (Supervisor and Operator security levels)
- Holds a total of 1,024 encryption keys (traffic and shadow combined)
- Menu System User Interface — allows system-specific and user settings to be configured
- Supports software upgrades via PCMCIA Card slot and Motorola's FLASHport™ technology
- Supports the following encryption algorithms:
 - DES (CFB, XL, and OFB)
 - DVP
 - DVP-XL
 - DVI-XL

Note that the *KVL 3000* can support any single algorithm, or DES and one other algorithm (dual algorithm KVLs).

- Supports the following encryption protocols:
 - 12 kbps SECURENET™
 - 9.6 kbps Secure ASTRO™ (VSELP Vocoder)
 - 9.6 kbps Secure APCO Project 25 (IMBE Vocoder)
- Supports the following encryption standards:
 - FIPS 46–2
 - FIPS 81
 - FIPS 140–1 Level 1
- RS232 and Keyload I/O Ports
- Supports serial and PCMCIA modems
- Supports sharing keys between two KVLs
- Event Log maintains running record of KVL activities
- Supports transfer of keys to/from a Key Management Controller (KMC)

Using the KVL 3000

Overview of Encryption Concepts

Secure communications systems are designed to provide coded (“encrypted”) voice and data signals between some or all links in the system (including RF links and network links). In order to do this, each device (e.g., radio, fixed encryption unit) is loaded with a multi-digit encryption variable (a “key”). This key is used by the encryption algorithm (e.g., DES, DVI-XL, etc.) built into the device to mathematically “encrypt” all transmitted voice and data signals, and decode all “encrypted” received voice and data signals.

Only devices in the system with the same algorithm and encryption key can decode the encrypted signal and carry on communications with each other. Talk groups can therefore be created by controlling the assignment of encryption keys to specific groups of radios.

Traffic Keys and Shadow Keys

The *KVL 3000* stores two basic types of encryption keys:

- **Traffic Keys** — Used by subscriber units to encrypt/decrypt voice and data communications
- **Shadow Keys** — Used by the *KVL 3000* and KMC to provide an additional level of encryption to the encryption keys when transferring keys directly to the KMC or over the air to secure subscriber devices.

Both types of keys are stored in the *KVL 3000* memory in an encrypted format and are protected from tampering.

Using the *KVL 3000* (continued)

Overview of Entering and Loading Keys

Encryption keys are entered by the user into the *KVL 3000* memory locations (slots). The keys may then be transferred (loaded) to a target device, such as a secure radio.

A two-step process is required for most encryption keys:

- Create (enter) the multi-digit encryption key into the *KVL 3000* memory
- Connect the *KVL 3000* to a target device (e.g., radio) and transfer the key to the target device.

In addition, the creation and transfer of Unique Shadow Keys (USKs), Common Shadow Keys (CSKs), LIDs, and other refinements to the encryption keys are sometimes required depending on the system requirements. The remaining chapters in this manual describe these additional refinements.

Using the Menu System

Menu Architecture

The *KVL 3000* Menu System is organized as shown on the facing page. Each menu selection is summarized below.

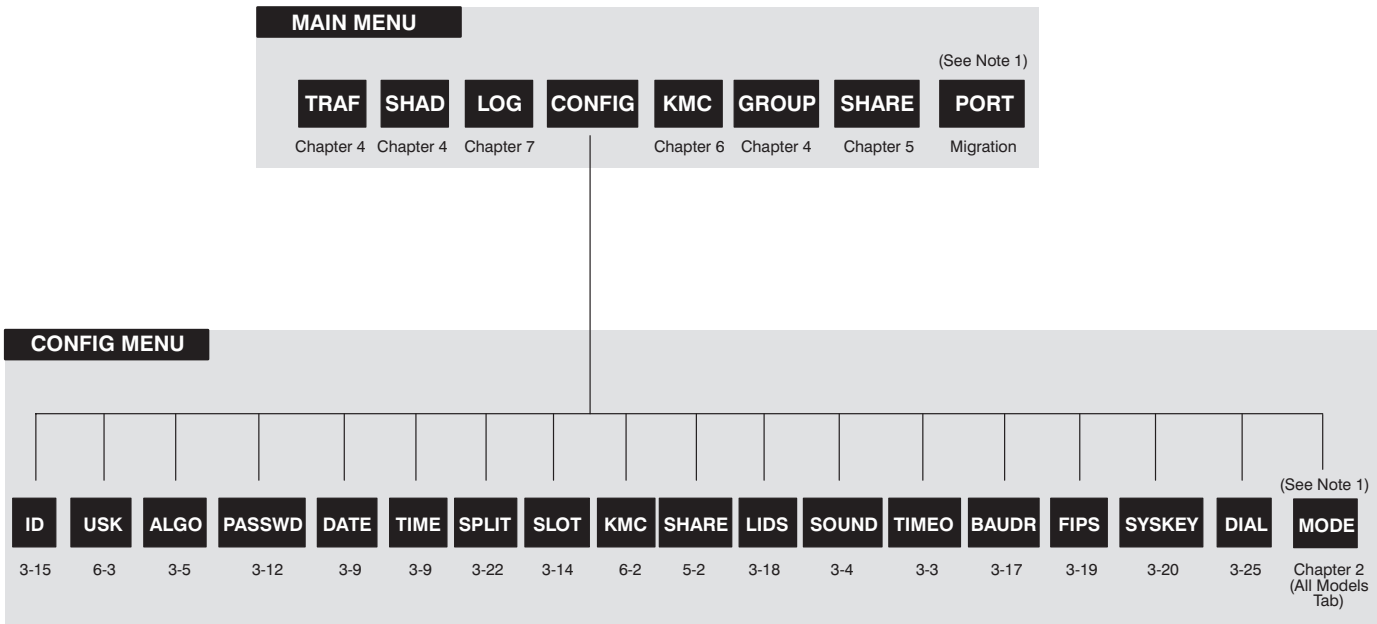
MAIN Menu

- **TRAF** — Provides access to screen used for entering Traffic-type encryption keys
- **SHAD** — Provides access to screen used for entering Shadow-type encryption keys
- **LOG** — Provides access to screen used for viewing and printing log entries
- **CONFIG** — Provides access to Configuration Menu (see **CONFIG Menu** below)
- **KMC** — Provides access to screen used for connecting via modem or directly (via RS232 port) to KMC
- **GROUP** — Provides access to screen used for creating Group Maps (4 maximum)
- **SHARE** — Provides access to screen used for transferring all keys from one *KVL 3000* to another *KVL 3000* via RS232 port
- **PORT** — Provides access to screen used for copying encryption keys from ASN storage (stored by PIDs) to *ASTRO 25* storage (stored by CKRs) and vice versa

CONFIG Menu

- **ID** — Provides access to screen used for entering the KVL's MDC ID (OTAR systems only)
- **USK** — Provides access to screen used for entering the KVL's Unique Shadow Key

— continued on page 2-8 —



Notes

1. The PORT and MODE menu selections appear only on *KVL 3000* models that are equipped with **both** X795 ASN Operation and U239 ASTRO 25 Operation options.

Using the Menu System (continued)

Note *LIDS is required for ASTRO systems only.*

Menu Architecture (continued)

- **ALGO** — Provides access to screen used for activating/deactivating algorithms, setting default algorithm, turning prompt on/off
- **PASSWD** — Provides access to screen used for entering Supervisor and Operator passwords (required for FIPS operation; otherwise optional)
- **DATE** — Provides access to screen used for entering current date.
- **TIME** — Provides access to screen used for entering current time.
- **SPLIT** — Provides access to screen used for adjusting the Traffic Key/Shadow Key Memory split
- **SLOT** — Provides access to screen used for entering the default Target Slot
- **KMC** — Provides access to screen used for turning on/off KMC capability (if on, log cannot be cleared)
- **SHARE** — Provides access to screen used for turning Sharing (between two KVL 3000s) capability on and off
- **LIDS** — Provides access to screen used for turning LIDS capability on and off
- **SOUND** — Provides access to screen used for turning KVL 3000 tones on and off
- **TIMEO** — Provides access to screen used for setting delay (from 30 to 255 seconds) for KVL 3000 to power down if no keypad activity detected

— continued on page 2–9 —

Using the Menu System (continued)

Note *The default BAUDR setting is 9600*

Note *If FIPS is ON, the passwords function is required.*

Menu Architecture (continued)

- **BAUDR** — Provides access to screen used for setting the baud rate used by the KVL 3000 to communicate via the RS232 port directly or via modem (2400, 4800, 9600, 19200, and 57600)
- **FIPS** — Provides access to screen used for turning FIPS mode on/off
- **SYSKEY** — Provides access to screen used for entering DVI-XL System Key (DVI-XL only)
- **DIAL** — Provides access to screen used for selecting **Tone** or **Pulse** dialing methods when using a modem
- **MODE** — Provides access to screen used for switching between ASN and ASTRO 25 operation.

Using the Menu System (continued)

Navigating Through the Menus

Each time you power up the *KVL 3000* in ASN mode, the display shown below appears. The title **ASN** displays to indicate that you are in the *ASN Main Menu*. The two choices at the bottom of the display (**TRAF** and **SHAD**) are the first two items in the *ASN Main Menu*.



To scroll through the *ASN Main Menu* choices, press the ◀ or ▶ keys. The menu is constructed as a continuous loop; therefore, repeatedly pressing ◀ or ▶ scrolls the menu from start to finish, then back to start.

To access the *Config Menu*, press the ◀ or ▶ keys to display **CONFIG** in the *Main Menu*, then press ⏏ to enter the *Config Menu*.

To select an *ASN Main* or *Config Menu* choice, press the softkey (⏏) that is directly below the choice. The display will show the screen corresponding to the menu choice.

To “back out” of a menu, press the **Esc** key. Repeatedly pressing this key will eventually return you to the initial *ASN Main Menu* screen.

Chapter 3 Performing Initial Programming

chapter contents

Perform Initial Programming **2**

Perform Initial Programming

Introduction

Before using your *KVL 3000* to enter and load encryption keys, several parameters that determine how the *KVL 3000* operates must be programmed. The parameters are divided into two categories:

- User Preference
- System Dependent

Instructions for programming these parameters begin on the next page.

Note *Many of the parameters described in this chapter are also accessible from the CONFIG menu in ASTRO 25 operating mode. Making changes to one of these common parameters from either ASN or ASTRO 25 operating mode affects the setting for both modes. For example, if you are in ASN mode and change the Power-Down Timeout setting (TIMEO) to 60 seconds, the timeout will also be 60 seconds when in ASTRO 25 operating mode.*

The common parameters are as follows:

- **PASSWD** (setting Supervisor and Operator passwords)
- **DATE** (setting month, day, year)
- **TIME** (setting hours, minutes, seconds)
- **SHARE** (on or off)
- **SOUND** (on or off)
- **TIMEO** (setting timeout period in seconds)
- **BAUDR** (selects baud rate for RS232 communications)
- **FIPS** (on or off)
- **SYSKEY** (allows System Key to be entered; for DVI-XL algorithms only)
- **DIAL** (setting Tone or Pulse dialing)

Perform Initial Programming (continued)


User Preference Parameters

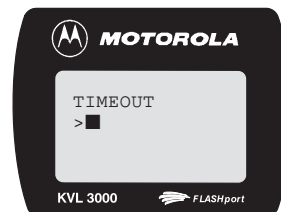
The parameters and settings in this category are not required for operation of the *KVL 3000*, but instead provide a way of customizing certain functions to suit each individual user.

Set Power-Down Timeout — The *Power-Down Timeout* feature allows you to program a time period (from 30 to 255 seconds). If the *KVL 3000* remains idle for the programmed time period, it will power down. To set the timer:

1. Navigate to the **CONFIG** menu, then navigate to and select **TIMEO**. The following screen will appear:



2. Press  to select **EDIT**. The following screen will display. Enter the desired timeout time (in seconds). The range is from 30 to 255.



3. Press the **Enter** key to save the new value.

Perform Initial Programming (continued)



User Preference Parameters (continued)

Turn On/Off Display Backlighting — The *KVL 3000* powers up with display backlighting turned off. If desired, you may turn on backlighting at any time by pressing and holding the **Del/Shift** key, then pressing the **B** key. Repeat to turn backlighting off.

Turn On/Off Sounds — The *KVL 3000* emits a tone each time a keypad button is pressed. Also, tones are emitted during certain operating conditions (e.g., prior to the timeout timer expiring). You can turn sounds on and off as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **SOUND**. The following screen will appear:



2. Use the  keys to select **ON** or **OFF**, as desired. The  icon will display to indicate that sounds are turned off.

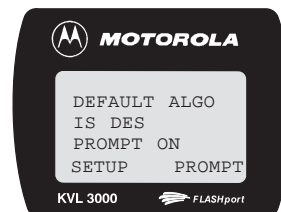
Perform Initial Programming (continued)


User Preference Parameters (continued)

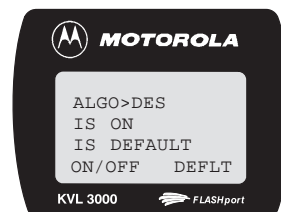
Setup the Algorithms — The *KVL 3000* is capable of supporting up to two encryption algorithms (e.g., DES, DVI-XL, etc.), depending on the options ordered at the time of purchase. Using the **ALGO** menu selection, you can turn an algorithm off (requires dual algorithm *KVL 3000*), make one of the two algorithms the default when entering keys, and turn on/off the algorithm prompt that appears when entering keys. Each of these programming tasks is described below.

To turn an algorithm off ...

1. Navigate to the **CONFIG** menu, then navigate to and select **ALGO**. The following screen will appear:






2. Use the  key to select **SETUP**. The following screen will appear.



— continued on next page —

Perform Initial Programming (continued)

- Use the  or  keys to select the desired algorithm. Then use the  key to select **ON/OFF** to turn the algorithm off.

Note You can not turn off the default algorithm. Also, you can not turn off the algorithm in a single algorithm KVL 3000, or if the other algorithm (dual algorithm KVL 3000s) is turned off.

To make an algorithm the default

For dual algorithm KVL 3000s, one of the two algorithms will be set to default. This is the algorithm that is automatically selected when entering keys, saving you the inconvenience of having to select between the two algorithms if all or many of your keys use the same algorithm. To switch the default to the other algorithm, perform the following steps.

Note On single algorithm KVL 3000s, the single algorithm is always the default and can not be changed or turned off.


- Navigate to the **CONFIG** menu, then navigate to and select **ALGO**. The following screen will appear:

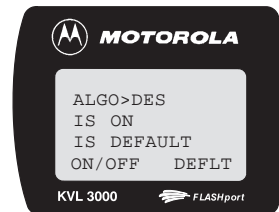





— continued on next page —

Perform Initial Programming (continued)

User Preference Parameters (continued)

2. Use the  key to select **SETUP**. The following screen will appear.



3. Use the  or  keys to select the non-default algorithm. Then use the  key to select **DEFLT** to make this algorithm the default.

Note This action automatically removes the default status from the other algorithm.

Turning the Prompt On/Off

When accessing the screen to enter a key, you are prompted (if prompt is turned on) to select an algorithm and press **ACCEPT** before entering the actual key characters. By turning the prompt off, you can bypass this step and go directly to the screen in which you enter the key characters. If desired, turn the prompt off as follows.

1. Navigate to the **CONFIG** menu, then navigate to and select **ALGO**. The following screen will appear:



— continued on next page —

Perform Initial Programming (continued)

User Preference Parameters (continued)

2. Use the ☐ key to select **PROMPT**. The following screen will appear.



3. Use the ☐ key to select **OFF**.

(Note that with the prompt turned off, any keys you enter will automatically be assigned the default algorithm.)

Perform Initial Programming (continued)


User Preference Parameters (continued)

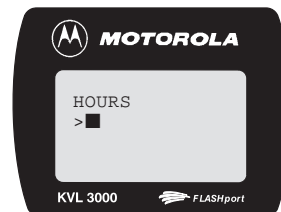
Set Time and Date — The *KVL 3000* contains an internal real time clock that is used to timestamp (with date and time) the log entries. If you wish to have these entries timestamped, you must set the time and date. The clock will continue to run using power from the 3 V coin-cell battery, even when the *KVL 3000* main power is turned off.

To set the time ...

1. Navigate to the **CONFIG** menu, then navigate to and select **TIME**. The following screen will appear:



2. Use the  key to select **EDIT**. The following screen will appear.



3. Using the keypad, enter the hours and press **Enter**. Repeat for minutes and seconds. (The clock operates in 24-hour military-style format.)


Perform Initial Programming (continued)

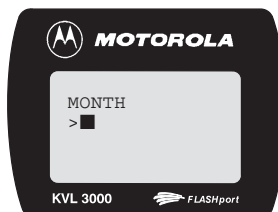
User Preference Parameters (continued)

To set the date ...

1. Navigate to the **CONFIG** menu, then navigate to and select **DATE**. The following screen will appear:




2. Use the  key to select **EDIT**. The following screen will appear.



3. Using the keypad, enter the month and press **Enter**. Repeat for date and year. The following screen will appear.



4. Use the  keys to select the desired format.
US = 12/25/98; Europe = 25/12/98

Perform Initial Programming (continued)

User Preference Parameters (continued)

Turn On/Off Sharing — In addition to loading keys into target devices, the *KVL 3000* can also “share” its keys with another *KVL 3000*. In order to share keys, the sharing feature must be turned on in both the source and target KVL. (Refer to **Chapter 5** for details on the sharing feature.) Turn Sharing on as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **SHARE**. The following screen will appear:



2. Use the ☐ keys to select **ON** (or **OFF**), as desired.

Perform Initial Programming (continued)

User Preference Parameters (continued)

Set Up Passwords — The *KVL 3000* provides two levels of security access, **Supervisor** and **Operator**. The Supervisor has access to all functions and features. The Operator has access to all functions *except* **Edit** and **Clear** (although can edit the Operator password). Without password protection, all users have access to all of the *KVL 3000* functions.


Note *If FIPS is turned on, passwords are required.*

Note *You can not set just Supervisor or Operator passwords, but must set both if password feature is desired.*

To create the passwords, perform the following:

1. Navigate to the **CONFIG** menu, then navigate to and select **PASSWD**. The following screen will appear:



2. Use the  key to select **EDIT**. The following screen will appear.



— continued on next page —

Perform Initial Programming (continued)

User Preference Parameters (continued)

3. Enter the desired Supervisor password. The password must contain 6 characters using any of the keypad buttons 0 thru F. When finished, press the **Enter** key.
4. Repeat for the Operator password. The following screen will confirm your password entries. Whenever the KVL 3000 is powered up, a password will be required before operating the unit.



Important Note *If the Supervisor password is forgotten, a reset (see page 8–10) must be performed before the KVL 3000 can be used again. Because a reset erases all stored keys and returns the KVL 3000 settings to the factory defaults, you are strongly encouraged not to forget your password.*

If the Operator password is forgotten, the Supervisor can simply assign a new Operator password (overwriting the old password).


Perform Initial Programming (continued)

User Preference Parameters (continued)

Select Default Target Slot — This setting allows the KVL 3000 to load keys to a default slot on the target unit. Setting a default eliminates the need to select a target slot during a keyload operation (although you can override the default if desired when loading keys). To set a default target slot, perform the following:

1. Navigate to the **CONFIG** menu, then navigate to and select **SLOT**. The following screen will appear:



2. Use the  key to select **EDIT**. The following screen will appear.



3. Using the keypad, enter the desired default target slot (range is 0000 through 1023). When finished, press the **Enter** key.

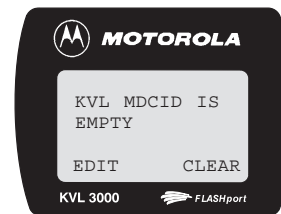
Perform Initial Programming (continued)

System Dependent Parameters

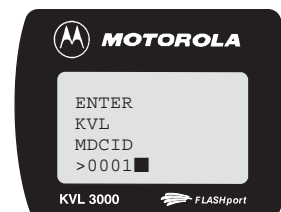
The parameters and settings in this category must be set depending on the particular system in which the *KVL 3000* will be operating.

Create the MDC ID (OTAR Only) — The MDC ID is used when the *KVL 3000* communicates with a KMC (in an Advanced SECURENET™ OTAR system). Enter this unique ID as follows:

1. Navigate to the **CONFIG** menu, then select **ID**. The following screen will appear:



2. Press to select **EDIT**. The following screen will display. Using the **Del/Shift** key, “back out” the digits and enter the desired 4-digit ID. Do not use all 0’s. Do not use any F’s. Do not use E as the first character.



3. Press the **Enter** key to save the ID.

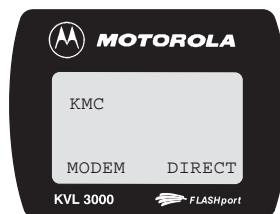
Perform Initial Programming (continued)

System Dependent Parameters (continued)

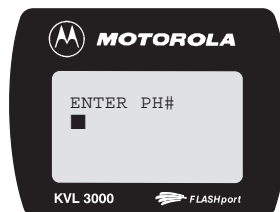
Set KMC Phone Number (OTAR Only) —

When using a modem connection to communicate with the KMC, the *KVL 3000* must know the dial-up phone number for the KMC. Enter this phone number as follows:

1. From the **MAIN** menu, navigate to and select **KMC**. The following screen will appear:



2. Press ☐ to select **MODEM**. The following screen will display. Enter the dial-up phone number of the KMC (include 1 and area code if necessary). Press the **Enter** key.



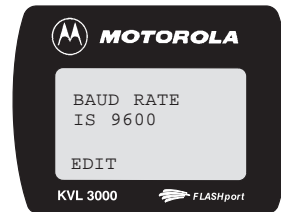
3. Since you are only presetting the phone number and do not wish to make a connection at this time, press the **Esc** key to leave the menu.

Perform Initial Programming (continued)

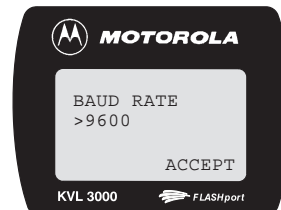
System Dependent Parameters (continued)

Select Modem Baud Rate (OTAR Only) —
When using a direct (cable) or modem connection to communicate with the KMC, the baud rate of the KMC must be selected. Select this baud rate as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **BAUDR**. The following screen will appear:



2. Press to select **EDIT**. The following screen will display.
Use the or keys to select the desired baud rate (choices are 2400, 4800, 9600, 19200, and 57600).



3. Press to select **ACCEPT**.

Perform Initial Programming (continued)

Note *LIDS are required in ASTRO systems, not used in Securenet systems, and optional (depending on radio parameter set by the RSS). It is recommended that the LIDS prompt be left ON.*

System Dependent Parameters (continued)

Turn LIDS Prompt On/Off (ASTRO Only) — Logical IDs (LIDS) provide an additional level of security in *ASTRO* systems. With the LIDS prompt turned on, you are prompted to enter a 4-digit LID each time you enter a key. Turn the LIDS prompt on as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **LIDS**. The following screen will appear:

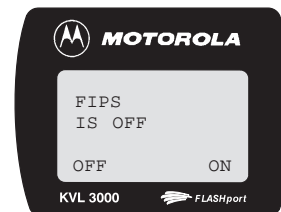


2. Press ☐ to select **ON**.

**Perform Initial Programming
(continued)****System Dependent Parameters
(continued)**

Turn FIPS On/Off — When turned on, FIPS operation causes the *KVL 3000* to operate in a mode that is compliant with the U.S. Federal Information Processing Standard (FIPS) 140-1 guidelines. This mode of operation enforces the use of passwords and activates tamper protection. If tampered with (e.g., back cover removed), if the main battery is dead, if the main battery is removed while the *KVL 3000* is on, or if the main battery is removed for an extended period of time (i.e., several minutes), all previously entered keys will be erased. With FIPS operation turned off, all previously entered keys will not be erased if the aforementioned conditions occur. Turn FIPS operation on as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **FIPS**. The following screen will appear:



2. Press ☐ to select **ON**.

Perform Initial Programming (continued)

System Dependent Parameters (continued)

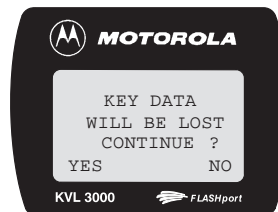
Enter System Key (DVI-XL Only) — The KVL 3000 requires a 128-digit System Key to communicate in DVI-XL systems. Each KVL 3000 is shipped from the factory with a default System Key. Change this key as described below.

Important *Changing the System Key causes all keys defined with the DVI-XL algorithm (including the USK for ASN, and UKEK for ASTRO 25) to be **erased** (includes DVI-XL keys in both ASN and ASTRO 25 memory).*

1. Navigate to the **CONFIG** menu, then navigate to and select **SYSKEY**. The following screen will appear:



2. Press ☐ to select **EDIT**. The following warning screen will appear.

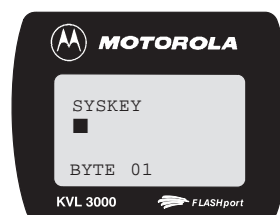


— continued on next page —

Perform Initial Programming (continued)

System Dependent Parameters (continued)

3. Press ☐ to select **YES**. The following screen will appear.



4. Enter the 128-digit System Key. The display will show **SLOT FILLED** when completed. Press the **Enter** key.
5. The display will show **BUSY... ERASING KEYS** while the keys and USK are erased.

Perform Initial Programming (continued)

Note The smallest allowed split value is **16**; the largest allowed split value is **1008**.

System Dependent Parameters (continued)

Set Traffic/Shadow Key Memory Split (Only if more than 512 traffic keys) — The KVL 3000 can store a total of 1024 encryption keys (traffic and shadow combined). If the memory split value is set to 512, then each key type takes up an equal partition in the key memory (i.e., 512 traffic keys and 512 shadow keys). You can, if desired, change the split value to adjust the partitioning. For example, setting the split value to 800 would result in 800 traffic keys and 224 shadow keys (1024 minus 800 = 224). Change the split value as described below.


Note Changing the split value is typically performed only when there are more than 512 traffic keys.

1. Navigate to the **CONFIG** menu, then navigate to and select **SPLIT**. The following screen will appear:



— continued on next page —

Perform Initial Programming (continued)

2. Press  to select **EDIT**. The following screen will appear.



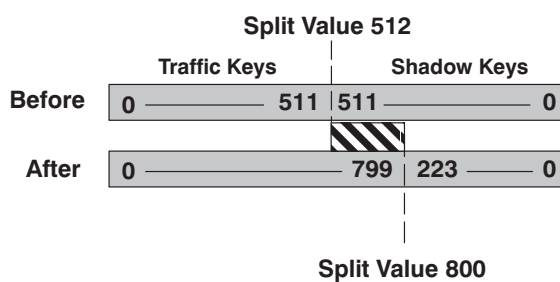
3. The KVL 3000 prompts you to enter the number of slots you wish to assign for Traffic Keys. Press the **Del/Shift** key to “back out” the digits (as desired) and enter the desired number. (The KVL 3000 automatically assigns the remaining slots to Shadow Keys.)
4. When finished, press the **Enter** key.

Important When you change the split value, the KVL 3000 adjusts for the split by erasing some existing keys. The two scenarios on the next page illustrate how this occurs.

— continued on next page —

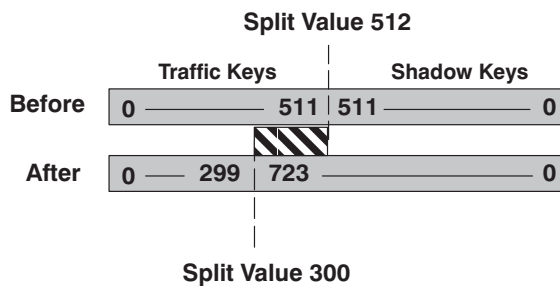
Perform Initial Programming (continued)

Changing Split Value from 512 to 800



= Shadow Keys 224 thru 511 are erased

Changing Split Value from 512 to 300



= Traffic Keys 300 thru 511 are erased

Perform Initial Programming (continued)

System Dependent Parameters (continued)

Set Modem Dialing to Pulse or Tone — When downloading keys from a KMC to the *KVL 3000* via a modem connection, the *KVL 3000* can be set to dial using either pulses or DTMF tones, depending on the type of phone line being used. Set accordingly as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **DIAL**. The following screen will appear:



2. Press ☐ to select **TONE** or **PULSE**, as desired.


Notes ...

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Loading Shadow Keys	20
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Using Group Maps	26

Entering Traffic and Shadow Keys

To enter a Traffic Key or a Shadow Key into the KVL 3000 internal key database, perform the following:



1. Use the  key to select **TRAF** or **SHAD** from the *Main Menu*. The following screen will appear (Traffic menu shown).



2. Use the  or  keys to select the desired key location (or use the keypad to directly enter the location number).
3. Use the  key to select **EDIT**. If the algorithm prompt is turned on (see page 3–7), the following screen will appear. If the prompt is turned off, skip to step 5.



IMPORTANT! When entering a DES-CFB, DES-XL, or DES-OFB key, select DES as the algorithm type.


4. Use the  or  keys to select the desired algorithm for this key.

— continued on next page —

Entering Traffic and Shadow Keys (continued)

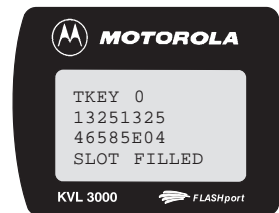
Note (For DES keys only) As you enter each byte of the encryption key, it is checked by the KVL 3000 for validity. If you enter an invalid number, **WRONG PARITY** will flash in the display, and the invalid entry is ignored. Continue with the entry. (For non-DES keys) Encryption key validity is checked only after entire key is entered and **Enter** key is pressed.

Note A LID will be automatically generated if this key does not require entry of a 4-digit_{HEX} LID.

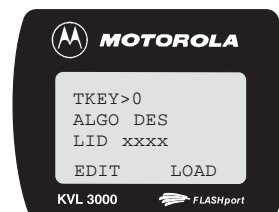
5. Use the  key to select **ACCEPT**. The following screen will appear.



6. Enter the encryption key using the keypad. The specific byte number is displayed as you enter the key numbers. When finished, the following screen will appear:



7. Press the **Enter** key. If the LID prompt is turned off (see page 3–18), the following screen will appear to confirm your entry. If the LID prompt is turned off, skip to step 8.



— continued on next page —

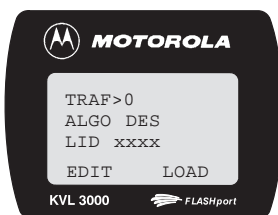
Entering Traffic and Shadow Keys (continued)

Note The KVL 3000 will not accept traffic keys of the same algorithm type with duplicate LIDs (i.e., each key within a particular algorithm type must have a unique LID). Duplicate LIDs with all zeros **are** accepted.

8. If the LID prompt is turned on, the following screen appears, prompting you to enter a 4-digit_{HEX} LID. Enter the LID using the keypad.



9. Press the **Enter** key. The following screen will appear to confirm your entry.



Loading Traffic Keys

Introduction

There are multiple procedures for loading traffic keys from the *KVL 3000* to a target device. Each procedure varies depending on the type of target device, as follows:


- *SECURENET* Single Key Radio **(page 4–6)**
- *Advanced SECURENET* Multiple Key Radio **(page 4–8)**
- *ASTRO* Single Key Radio **(page 4–11)**
- *ASTRO* Multiple Key Radio **(page 4–13)**
- Fixed Unit (e.g., RNC, DIU, CIU) with more than 16 keys **and** DVI-XL Algorithm **(page 4–15)**
- Fixed Unit (e.g., RNC, DIU, CIU) with more than 16 keys and **other than** DVI-XL Algorithm **(page 4–18)**

— continued on next page —




Loading Traffic Keys (continued)

Loading Traffic Keys (SECURENET Single Key Target Radio)

In this procedure, a single key is loaded to the single key *SECURENET* target radio.

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TRAF** from the *Main Menu*. The following screen will appear:



3. Use the  or  keys to select the traffic key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear while the key is being loaded.



— continued on next page —

Loading Traffic Keys (continued)

5. When finished, the following screen will appear to confirm that the key was loaded to the target radio:




◆ End of This Procedure ◆




Loading Traffic Keys (continued)

Loading Traffic Keys (Advanced SECURENET Multiple Key Target Radio)

In this procedure, a single key is loaded to a multiple key *Advanced SECURENET* target radio.

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TRAF** from the *Main Menu*. The following screen will appear:






3. Use the  or  keys to select the traffic key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear:



— continued on next page —


Loading Traffic Keys (continued)

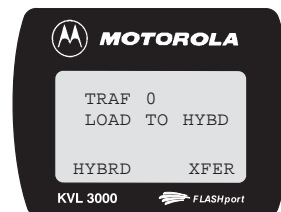
5. For normal key loading, you will load the key into the target's main key storage. To do this, follow steps 6 through 8. For diagnostics purposes, you may instead load the key directly into a special diagnostics location (i.e., the hybrid). To do this, follow steps 9 through 11.
6. Use the  or  keys to select the desired target slot, then press the **Enter** key.
7. Use the  key to select **XFER**. The following screen will appear:



8. When finished, the screen will display **KEY LOAD SUCCESSFUL** to confirm that the key was loaded to the target radio.


End of Normal Keyloading Procedure

9. Use the  key to select **HYBRD**. The following screen will appear:



— continued on next page —

Loading Traffic Keys (continued)

10. Use the  key to select **XFER**. The following screen will appear:




11. When finished, the screen will display **KEY LOAD SUCCESSFUL** to confirm that the key was loaded to the hybrid in the target radio.

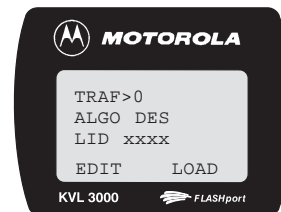
◆ End of This Procedure ◆




Loading Traffic Keys (continued)

Loading Traffic Keys (ASTRO Single Key Target Radio)

In this procedure, a single key is loaded to the microprocessor in an *ASTRO* target radio.

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TRAF** from the *Main Menu*. The following screen will appear:



3. Use the  or  keys to select the traffic key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear while the key is being loaded.



— continued on next page —

Loading Traffic Keys (continued)

5. When finished, the following screen will appear to confirm that the key was loaded to the target radio:




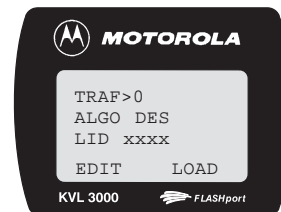
◆ End of This Procedure ◆




Loading Traffic Keys (continued)

Loading Traffic Keys (ASTRO Multiple Key Target Radio)

In this procedure, a single key is loaded to the microprocessor in a *ASTRO* target radio.

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TRAF** from the *Main Menu*. The following screen will appear:






3. Use the  or  keys to select the traffic key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear:



— continued on next page —

Loading Traffic Keys (continued)

5. Use the  or  keys to select the desired target slot, then press the **Enter** key.
6. Use the  key to select **XFER**. The following screen will appear while the key is being loaded:



7. When finished, the following screen will appear to confirm that the key was loaded to the target radio:




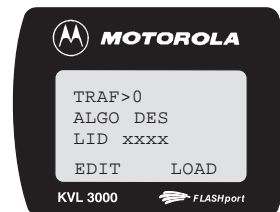
◆ End of This Procedure ◆




Loading Traffic Keys (continued)

Loading Traffic Keys (Fixed Unit Target; More than 16 keys; DVI-XL Algorithm)

In this procedure, a single key is loaded to a fixed unit (e.g., CIU, DIU, RNC, etc.).

1. Turn on the *KVL 3000* and the target fixed unit, then connect them using the appropriate cable.
2. Use the  key to select **TRAF** from the *Main Menu*. The following screen will appear:



3. Use the  or  keys to select the traffic key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear:






— continued on next page —

Loading Traffic Keys (continued)

5. Use the keypad to enter the location number into which you wish to store the System Key. When finished, press the **Enter** key. The following screen will appear:



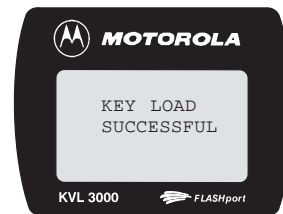
6. Use the  or  keys to select the desired target slot, then press the **Enter** key.
7. Use the  key to select **XFER**. The following screen will appear while the key is being loaded:



— continued on next page —

Loading Traffic Keys (continued)

8. When finished, the following screen will appear to confirm that the key was loaded to the target fixed unit:




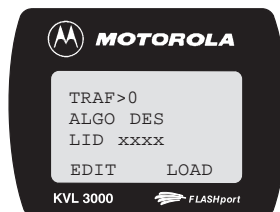
◆ End of This Procedure ◆




Loading Traffic Keys (continued)

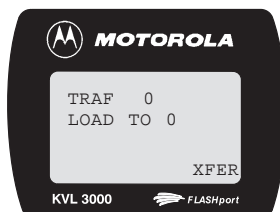
Loading Traffic Keys (Fixed Unit Target; More than 16 keys; Other than DVI-XL Algorithm)

In this procedure, a single key is loaded to a fixed unit (e.g., CIU, DIU, RNC, etc.) with more than 16 key locations and an algorithm other than DVI-XL or a Custom Application algorithm.

1. Turn on the *KVL 3000* and the target fixed unit, then connect them using the appropriate cable.
2. Use the  key to select **TRAF** from the *Main Menu*. The following screen will appear:






3. Use the  or  keys to select the traffic key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear:



— continued on next page —

Loading Traffic Keys (continued)

5. Use the  or  keys to select the desired target slot, then press the **Enter** key.
6. Use the  key to select **XFER**. The following screen will appear while the key is being loaded:




7. When finished, the following screen will appear to confirm that the key was loaded to the target fixed unit:

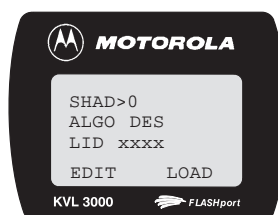





◆ End of This Procedure ◆

Loading Shadow Keys

In this procedure, you will load a shadow key to either a Common Shadow Key (CSK) slot or a Unique Shadow Key (USK) slot in the target device. (Shadow Keys are only applicable for target devices in OTAR systems.)

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **SHAD** from the *Main Menu*. The following screen will appear:






3. Use the  or  keys to select the shadow key you wish to load to the target radio (or use the keypad to directly enter the location number).
4. Use the  key to select **LOAD**. The following screen will appear:



— continued on next page —

Loading Shadow Keys (continued)

5. Use the  or  keys to select the desired target slot (either CSK or USK). When finished, press the **Enter** key.
6. Use the  key to select **XFER**. The following screen will appear:




7. When finished, the following screen will appear to confirm that the key was loaded to the target radio:





Deleting Keys in KVL 3000

The delete feature allows you to erase an encryption key (traffic or shadow) stored in a specific key slot in the *KVL 3000*'s memory. Deleting permanently erases the encryption key currently stored in the slot. The slot is then considered to be "undefined" and may be used to hold another encryption key (using the *Entering Keys* procedure on page 4–2).

1. Use the  key to select **TRAF** or **SHAD** from the *Main Menu*. The following screen will appear (Traffic Key shown).



2. Use the  or  keys to select the desired key location (slot) you wish to delete (or use the keypad to directly enter the location number).
3. Press and hold the **Del/Shift** key, then press the **D** key. The following screen will appear asking you to confirm the deletion.



4. Use the  key to select **YES**.

Zeroizing Keys in Target Devices

Important! In order to zeroize keys, the KVL 3000 and the target device must be equipped with compatible algorithms, as follows (“A”, “B”, and “C” are used to represent specific algorithms, such as DES, DVI-XL, DVP, etc.):

If KVL has Algorithm “A”, target device must have Algorithm “A.”

If KVL has Algorithm “A” and “B”, then target device must have Algorithm “A” and “B.”


If KVL has Algorithm “A” and “B” and the target device has only Algorithm “A”, then you must configure the KVL for Algorithm “A” as the default algorithm.

If KVL has Algorithm “B” and “C” and target device has Algorithms “A” and “B”, then you must configure the KVL for Algorithm “B” as the default algorithm.

Introduction

The zeroize feature allows you to erase an encryption key (traffic or shadow) stored in a specific key slot in a secure target device (e.g., radio). Zeroizing permanently erases the encryption key currently stored in the slot. The slot is then considered to be “undefined” and may be used to hold another encryption key (using the Loading Keys procedure on page 4–5).

Zeroizing Traffic Keys in Target Devices

1. Connect the KVL 3000 to the target device using the appropriate cable. Turn both units on.
2. Use the  key to select **TRAF** from the Main Menu. The following screen will appear:




3. Press and hold the **Del/Shift** key, then press the **0** key to enter zeroize mode. The following screen will appear:






— continued on next page —


Zeroizing Keys in Target Devices (continued)

4. Use the  key to select **LOAD**. The following screen will appear:



5. Use the  or  keys to select the desired key location (slot) in the target device you wish to zeroize (or use the keypad to directly enter the location number).
6. Use the  key to select **XFER**. The *KVL 3000* will perform the “load” process and erase the encryption key stored in the selected slot in the target device. When finished, the display will show **KEY LOAD SUCCESSFUL**.

Zeroizing Shadow Keys in Target Devices

1. Connect the *KVL 3000* to the target device using the appropriate cable. Turn both units on.
2. Use the  key to select **SHAD** from the *Main Menu*. The following screen will appear:






— continued on next page —

Zeroizing Keys in Target Devices (continued)

3. Press and hold the **Del/Shift** key, then press the **0** key to enter zeroize mode. The following screen will appear:



4. Use the  or  keys to select **USK** or **CSK**.
5. Use the  key to select **XFER**. The KVL 3000 will perform the "load" process and erase the USK or CSK (as selected) in the target device. When finished, the display will show **KEY LOAD SUCCESSFUL**.

Using Group Maps

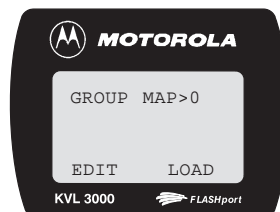
Introduction

The *KVL 3000* provides a convenient feature called “group mapping.” This feature allows you to group several keys stored in the *KVL 3000* memory and map each one to a specific target slot. You can then load the entire group of keys to the target device in a single operation. This is especially useful when loading the same group of keys to several target devices (e.g., a fleet of radios).

The *KVL 3000* supports up to four group maps (numbered 0–3), with each group consisting of up to 16 traffic keys and one Common Shadow Key (CSK).

Creating a Group Map

1. Navigate to and select **GROUP** in the *Main Menu*. The following screen will appear:




2. Use the ◀ or ▶ keys to select the desired group number (0–3) you wish to create.




— continued on next page —

Using Group Maps (continued)

Note By default, the KVL 3000 group maps are configured with the source slots matching the target slots (i.e., source slot 0 is mapped to target slot 0, source slot 1 is mapped to target slot 1, etc.).


- Use the  key to select **EDIT**. The following screen will appear. Note that the “S” in “S TRAF” stands for “Source” (i.e., KVL 3000 slot), and that the “D” in “D TRAF” stands for “Destination” (i.e., target slot).



- Use the  or  keys to select the first desired target slot number (0 thru 15).
- Using the keypad, enter the slot number for the traffic key stored in the KVL 3000 that you wish to map to the currently selected target slot. After entering the number, you may either press the **Enter** key, or wait a moment and the entry will be automatically confirmed (by the flashing cursor moving to the first digit of the source key number). You may also use the  key to select **NOCHG** or **ZERO**. Selecting **NOCHG** results in no changes being made to the key residing in the selected target slot when a load operation is performed. Selecting **ZERO** results in erasing the key residing in the selected target slot when a load operation is performed.

— continued on next page —

Using Group Maps (continued)

6. Repeat steps 4 and 5 until you have mapped the desired number of source and target keys (up to 16). After reaching traffic slot number 15, the next press of the  key will display the Common Shadow Key screen, as shown:



7. Using the keypad, enter the slot number for the Common Shadow Key stored in the KVL 3000 that you wish to map to the shadow key target slot. Again, you may either press the **Enter** key, or wait a moment for automatic confirmation. A CSK is required in OTAR systems only. If the target device does not require a CSK, select **NOCHG**.
8. When finished mapping the keys in this group map, press the **Enter** key. The following screen will appear:



— continued on next page —

Using Group Maps (continued)

9. The offset number is used for target devices with more than 16 key slots (e.g., a CIU has 1024 slots, a DIU has 512 key slots). The number you enter specifies into which *group of 16* target slots the keys in this group map will be loaded. You may enter any number from 0 thru 63 (0 = 1st group of 16, 1 = 2nd group of 16, etc.). If the target device has less than 16 keys, leave the offset number at 0.

For example, entering a 3 results in the group map keys being loaded into target slots 48–63, which is the 4th group of 16 keys.

Selecting Index 3 loads keys into target slots 48–63



Index Number	Target Slots
0	0 ↓ 15
1	16 ↓ 31
2	32 ↓ 47
3	48 ↓ 63
<hr/>	
63	1008 ↓ 1023

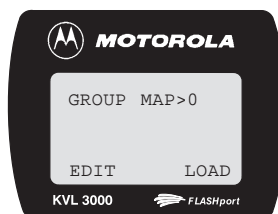
10. When finished, press the **Enter** key to save the group map.




◆ End of This Procedure ◆

Using Group Maps (continued)

Loading a Group Map

1. Turn the *KVL 3000* and the target unit on. Connect them using the appropriate cable.
2. Navigate to and select **GROUP** in the *Main Menu*. The following screen will appear:



3. Use the  or  keys to select the desired group number (0–3) you wish to load to the target device. When finished, use the  key to select **LOAD**. The following screen will appear:



— continued on next page —

Using Group Maps (continued)

4. The progress of the group load operation is displayed in the bottom line of the display. When finished, the following screen will appear to confirm that the group of keys was loaded to the target unit:



◆ End of This Procedure ◆

Notes ...

Chapter 5

Sharing Keys Between KVLs

chapter contents

About Sharing	2
Setting Up Connections	3
Share All Keys	4
Share Selected Key	5
Share Group Map and Associated Keys	6

About Sharing

Note *Sharing can not be performed between a KVL in ASN Mode and a KVL in ASTRO 25 mode. Refer to **Using the Key Porting Feature** behind the **MIGRATION** tab.*

Note *Sharing must be turned ON in both KVLs (using the **SHARE** setting in the **CONFIG** menu).*

Introduction

In addition to loading keys into target devices, the *KVL 3000* can also “share” its keys with another *KVL 3000* (or previous KVL model). When finished, the target KVL will contain all of the traffic keys, shadow keys, group maps, and KMC-sourced indexes as the source KVL.

Sharing Scenarios

The following sharing scenarios are supported.

- **Share All** — The “source” *KVL 3000* can share all of its keys (including traffic keys, shadow keys, group maps, and indexes) with another *KVL 3000* (page 5–4).
- **Share Single Key** — The “source” KVL can share a selected key with another *KVL 3000* (page 5–5).
- **Share Group Map(s)** — The “source” *KVL 3000* can share its group maps (and the keys associated with these group maps) with another *KVL 3000* (page 5–6)

Things to Know Before Sharing

- Only key data and group maps are shared. *KVL 3000* configuration settings, the USK for each algorithm, and log records for the target *KVL 3000* remain unchanged.
- Sharing can be performed between two *KVL 3000*s, or between a *KVL 3000* and an earlier model KVL. Either may be the source or target. The display will show **RETRO** during the sharing process to indicate that sharing is being performed between two dissimilar KVLs. Be sure to set the *KVL 3000*’s default algorithm to the type supported by the earlier model KVL.

Setting Up Connections

Introduction

In order to share keys between two KVLs, a KVL-to-KVL Transfer Cable (Model TKN8209) is required.

Connecting the *KVL 3000s*

Connect the transfer cable between the two KVLs as shown below.



Share All Keys



In this scenario, all traffic and shadow keys, as well as group maps (if present) and the KMC-sourced indexes (if present) are transferred from the source KVL to the target KVL.

Important! *In order to perform a Share All procedure, the target KVL must support the same algorithms (e.g., DES and DVI-XL, or DES and DVP-XL) as the source KVL.*

Example: *The source KVL is equipped with DES and DVP-XL, and there is at least one key defined for each algorithm. The target KVL must also be equipped with DES and DVP-XL.*

1. With both KVLs turned on and connected via the transfer cable, navigate to and select **SHARE** in the *Main Menu*. The following screen will appear:



2. Press  to select **XFER**. The  will flash on both KVLs, and both displays will show the progress of the sharing process, first with traffic keys, then with shadow keys, group maps, and indexes.
3. When finished, the source KVL emits a success tone and displays **SHARE ALL SUCCESSFUL** (the target KVL shows **SHARE SUCCESSFUL**) to indicate a successful sharing operation.



Share Selected Keys

In this scenario, a specific traffic or shadow key is shared from the source KVL to the target KVL. (This procedure is identical to loading a key from the KVL to a target radio. The KVL will recognize that it is loading to another KVL and automatically switch to a share operation.)

Important! *In order to share a selected key, the target KVL must be able to support the algorithm of the key being shared.*

1. With both KVLs turned on and connected via the transfer cable, navigate to and select **TRAF** or **SHAD** in the *Main Menu*. The following screen will appear (typical traffic key shown):

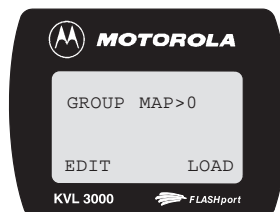






2. Press  to select **LOAD**. The  will flash on both KVLs, and both displays will show the progress of the sharing process (this occurs very quickly).
3. When finished, the source KVL emits a success tone and displays **KEY LOAD SUCCESSFUL** (the target KVL shows **SHARE SUCCESSFUL**) to indicate a successful sharing operation.

Share Group Map and Associated Keys

In this scenario, a specific group map (and associated keys) is shared from the source KVL to the target KVL. (This procedure is identical to loading a group map from the KVL to a target radio. The KVL will recognize that it is loading to another KVL and automatically switch to a share operation.)

1. With both KVLs turned on and connected via the transfer cable, navigate to and select **GROUP** in the *Main Menu*. The following screen will appear:



2. Press the  or  keys to select the Group Map you wish to share.
3. Press  to select **LOAD**. The  will flash on both KVLs, and both displays will show the progress of the sharing process, first with the group map data, then with the traffic keys associated with the specific group map.
4. When finished, the source KVL emits a success tone and displays **GROUP TRANSFER SUCCESSFUL** (target KVL shows **SHARE SUCCESSFUL**) to indicate a successful sharing operation.
5. Repeat this process for each Group Map you wish to share (up to four supported by KVL).

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Loading Keys from KMC to KVL (Direct Connection)	7
Loading Keys from KMC to KVL (Modem Connection)	10

Overview

Note Before using the KVL 3000 to perform tasks in an OTAR system, OTAR operation must be enabled by navigating to **KMC** in the **CONFIG** menu and selecting **ON**. Also, a USK must be programmed for each algorithm being used in an OTAR operation (as described on the next page).

Introduction

The Motorola Over-the-Air Rekeying (OTAR) system is a secure communications system in which encryption keys can be sent to subscriber units via radio transmission (instead of directly connecting a KVL to load keys). This type of system provides added flexibility and convenience in managing and administering encryption keys.

One of the infrastructure components in an OTAR system is the Key Management Controller (KMC). The KMC is a VME-based computer that is responsible for storing and managing the encryption keys for an OTAR system, as well as initiating key transmissions to the subscriber units (typically through a Console Interface Unit, or CIU, to a base station).

KVL-to-KMC Scenarios

The KVL 3000 can interface with the KMC to provide the following functions:

- Transfer the encryption keys required by the OTAR system from the KVL 3000 to the KMC — In this scenario, an operator loads the required keys into the KVL 3000, then connects the KVL 3000 to the KMC via a standard key loading cable and transfers the keys (one at a time) to the KMC for storage and management.
- Download encryption keys from the KMC into the KVL 3000 — In this scenario, the keys loaded into the KVL 3000 from the KMC are then loaded directly to target devices. This method is used where over-the-air rekeying can not be performed (e.g., for subscriber radios that do not support over-the-air rekeying). The download from the KMC to the KVL 3000 may be performed either by direct cable connection or via a modem connection.

Programming the USK

Important! *The USK needs to be entered only one time. Once entered, the USK is permanently stored in memory. The USK will be destroyed if FIPS is enabled and the KVL 3000 is opened or the Main Battery is removed for more than several minutes. The USK can also be deliberately cleared by using menu operations.*

For OTAR operation, a Unique Shadow Key (USK) must be programmed into the KVL 3000 for each algorithm being used. Each USK is a multi-character key typically assigned by the Crypto/Security Officer for the system, and is used to communicate with other secure equipment (such as a KMC). The exact number of characters is determined by the algorithm.



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Programming the USK (continued)

To create a **USK**, perform the following:

1. Navigate to the **CONFIG** menu, then select **USK**. The following screen will appear:



2. Use the  or  keys to toggle to the desired algorithm (for dual algorithm units only).
3. Select **EDIT** to display the following screen:




4. After entering the multi-character USK, **SLOT FILLED** appears. If the USK is correct, press the **Enter** key. If not, press the **Del/Shift** key to "back out" the digits and correct the USK entry, then press the **Enter** key.



To clear the **USK**, select **CLEAR** (instead of **EDIT**) in Step 3.

Loading Keys from KVL 3000 to KMC

In this procedure, encryption keys that have been entered and stored in the *KVL 3000* are transferred to the KMC one at a time. This scenario requires that the *KVL 3000* be connected directly to the KMC via a key load cable.

1. Request that the KMC operator set up the KMC to receive a key load from a KVL.
2. Connect the *KVL 3000* to the key load port on the KMC front panel using a standard key load cable (TKN8229A)
3. Use the  key to select **TRAF** (or **SHAD**, depending on the type of key the KMC is setup to accept) from the *Main Menu*. The following screen will appear (Traffic Key shown):




4. Use the  or  keys to select the desired key location for the traffic key you wish to load to the KMC (or use the keypad to directly enter the location number).

— continued on next page —

Loading Keys from KVL 3000 to KMC (continued)


Important LIDs are not transferred with the keys to the KMC. The KMC automatically assigns a new unique LID to all keys entered into the KMC.

Important If the key-load fails, make sure that the KMC is setup to accept the type of key (TRAF or SHAD) and algorithm type being transferred from the KVL 3000.

5. Use the  key to select **LOAD**. The following screen will appear:



Note that you do not have to select a target slot when transferring a key to the KMC. The KMC can accept only a single key at a time and controls where each key is loaded.

6. Use the  key to select **XFER**. The following screen will appear:



7. When finished, the screen will display **KEY LOAD SUCCESSFUL** to confirm that the key was loaded to the KMC.

◆ End of This Procedure ◆

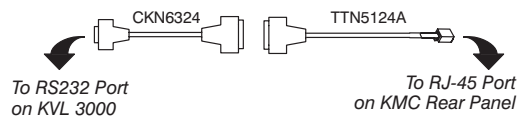
Loading Keys from KMC to the KVL 3000 using Direct Connection

In this procedure, encryption keys stored in the KMC are downloaded to the KVL 3000 via a direct cable connection.

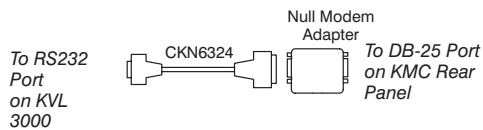
Note The KVL 3000 must have a USK assigned for the algorithm type of the keys being downloaded, and the USK must match the USK defined in the KMC. Also, the KVL 3000 must have an MDC ID configured (refer to **Chapter 4 — Preparing the KVL 3000 for Use** for details on setting the USK and MDC ID).

1. Connect the KVL 3000 to the rear panel of the KMC according to the KMC User's Guide instructions. The KVL 3000 may be connected to various types of KMC platforms, as follows:

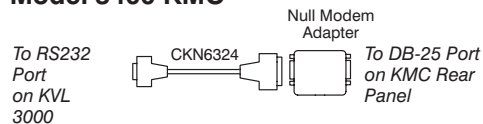
Series 900 KMC —



Series XR KMC —




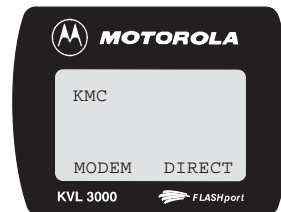
Model 3400 KMC —




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Loading Keys from KMC to the KVL 3000 using Direct Connection (continued)

2. Use the  key to select **KMC** from the *Main Menu*. The following screen will appear:



3. Use the  key to select **DIRECT**. The following screen will appear:



4. Use the  key to select **RS232**. The following screen will appear:



— continued on next page —

Loading Keys from KMC to the KVL 3000 using Direct Connection (continued)

5. The KVL 3000 will communicate with the KMC to begin the download process. While the keys are being downloaded, the display will show a single digit (first a 1, then a 2) sequentially scrolling back and forth across the display. This process can take several minutes.
6. When the keys have been successfully downloaded, the following screen will appear:



◆ End of This Procedure ◆

Loading Keys from KMC to the KVL 3000 using Modem Connection

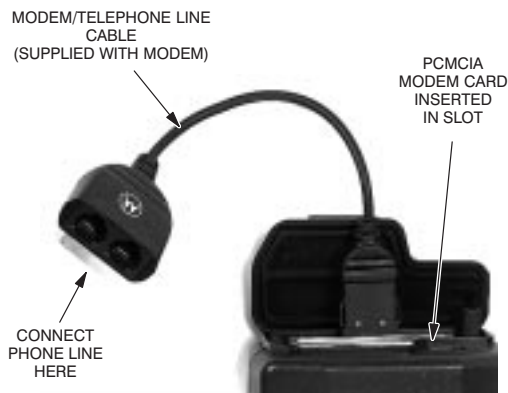
Note The KVL 3000 supports most single function PCMCIA modem cards. Multi-function cards (e.g., Modem/LAN cards) may have unique software requirements, and therefore may not work with the KVL 3000.

PCMCIA Modem Card Procedure

In this procedure, encryption keys stored in the KMC are downloaded to the KVL 3000 via a PCMCIA modem card.


Note The KVL 3000 must have a USK assigned for the algorithm type of the keys being downloaded, and the USK must match the USK defined in the KMC. Also, the KVL 3000 must have an MDC ID configured (refer to **Chapter 3 — Performing Initial Programming** for details on setting the USK and MDC ID).

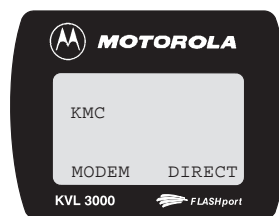
1. Request that the KMC operator set up the KMC to download keys to a KVL.
2. Insert the PCMCIA modem into the KVL 3000 and connect the cable to the phone line as shown below.




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Loading Keys from KMC to the KVL 3000 using Modem Connection (continued)

3. Use the  key to select **KMC** from the *Main Menu*. The following screen will appear:



4. Use the  key to select **MODEM**. The following screen will appear:



5. Enter the dial-up phone number of the KMC. Be sure to include 1 and area code, if required. (The *KVL 3000* stores the last phone number entered. If a phone number is displayed and it is not the phone number you wish to use, use the **Del/Shift** key to erase the number, then enter the desired number.)

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Loading Keys from KMC to the KVL 3000 using Modem Connection (continued)

6. When finished entering the phone number, press the **Enter** key. The following screen will appear:



7. Use the ☐ key to select **PCMCIA**. The following screen will appear:



8. The KVL 3000 will dial and connect with the KMC via the modem connection. The display shows the progress of the connection process. Once connected, the keys will be downloaded. During this time, the display will show a single digit (first a 1, then a 2) sequentially scrolling back and forth across the display. This process can take several minutes.

— continued on next page —

**Loading Keys from
KMC to the KVL 3000
using Modem
Connection
(continued)**

9. When the keys have been successfully downloaded, the KVL 3000 will terminate the connection, and the following screen will appear:



◆ End of This Procedure ◆

Loading Keys from KMC to the KVL 3000 using Modem Connection (continued)

External Modem Procedure

In this procedure, encryption keys stored in the KMC are downloaded to the KVL 3000 via an RS232 cable connection to an external modem.


Note *The KVL 3000 must have a USK assigned for the algorithm type of the keys being downloaded, and the USK must match the USK defined in the KMC. Also, the KVL 3000 must have an MDC ID configured (refer to **Chapter 3 — Performing Initial Programming** for details on setting the USK and MDC ID).*

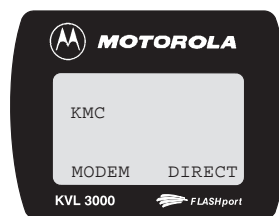
1. Request that the KMC operator set up the KMC to download keys to a KVL.
2. Connect a CKN6324 cable from the KVL 3000's RS232 port to the external modem, as shown below.




— continued on next page —

Loading Keys from KMC to the KVL 3000 using Modem Connection (continued)

3. Use the  key to select **KMC** from the *Main Menu*. The following screen will appear:



4. Use the  key to select **MODEM**. The following screen will appear:




5. Enter the dial-up phone number of the KMC. Be sure to include 1 and area code, if required. (The *KVL 3000* stores the last phone number entered. If a phone number is displayed and it is not the phone number you wish to use, use the **Del/Shift** key to erase the number, then enter the desired number.)

— continued on next page —

Loading Keys from KMC to the KVL 3000 using Modem Connection (continued)

6. When finished entering the phone number, press the **Enter** key. The following screen will appear:



7. Use the  key to select **RS232**. The following screen will appear:



8. The KVL 3000 will dial and connect with the KMC via the modem connection. The display shows the progress of the connection process. Once connected, the keys will be downloaded. During this time, the display will show a single digit (first a 1, then a 2) sequentially scrolling back and forth across the display. This process can take several minutes.

— continued on next page —

**Loading Keys from
KMC to the KVL 3000
using Modem
Connection
(continued)**

9. When the keys have been successfully downloaded, the KVL 3000 will terminate the connection, and the following screen will appear:



◆ End of This Procedure ◆

Notes...

Chapter 7 Viewing and Printing Log Records

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Viewing Log Records on KVL 3000 Display	3
Clearing Log Records	4
Transferring Log Records to a PC	5
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About Log Records

Introduction

The *KVL 3000* maintains a running record of the most recent 128 successful keyload operations. Each record is timestamped and contains detailed information about the particular keyload, including the type of key (traffic or shadow), the key number, and the target slot into which the key was loaded.

Access to the log records may be gained in three ways:

- Viewed and scrolled on the *KVL 3000* display
- Transferred to a PC for printing or saving to a file
- Printed directly from the *KVL 3000* to a serial printer

The log records may also be cleared (erased) from the *KVL 3000*.

How the Log Records are Organized

The log records are stored chronologically in a 128-location continuous buffer, with the most recent log record displayed first each time you access the log records.

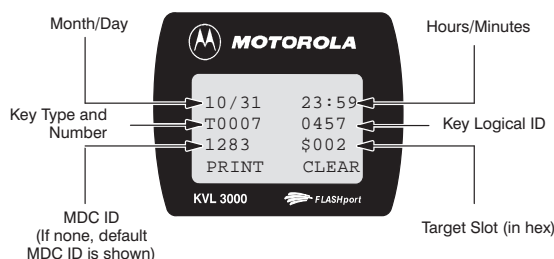
Each new log record created is appended to the beginning of the buffer, with each existing log record moving down one position.

When the buffer is full (128 entries maximum), the next new log record is appended to the beginning, the existing log records move down one position, and the oldest log record is overwritten.

View Log Records on KVL 3000 Display

Accessing the Log Records

Navigate to and select **Log** in the *Main Menu*. The following screen will appear (typical screen shown). This is the most recent log record.




- **Month/Day** — date keyload occurred
- **Hours/Minutes** — time keyload occurred (24-hour format)
- **Key Type and Number** — Traffic (T) or Shadow (S) and KVL 3000 key location number
- **Key Logical ID** — 4-digit hexadecimal Logical ID (required in ASTRO systems only)
- **MDC ID** — unique 4-digit hexadecimal ID defining your KVL (OTAR systems only)
- **Target Slot** — slot number (hexadecimal) in target device into which key was loaded

Scrolling Through the Log Records

With the first log record showing in the KVL 3000 display, press the ◀ or ▶ keys to scroll forward or backward through the 128 most recent records. Press the ▶ key to scroll backwards chronologically (i.e., most recent, next most recent, etc.). Press the ◀ key to scroll to the oldest record, then next oldest, etc.

Clearing Log Records

Note *Only supervisors can clear the log records.*

With any of the log records showing on the KVL 3000 display, press  to select **CLEAR**. The following screen will appear:



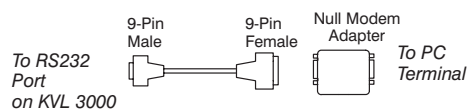
Remember! *In order to clear the log records, you must turn the KMC capability OFF (select **KMC** from the CONFIG Menu, then select **OFF**).*

Transferring Log Records to a PC

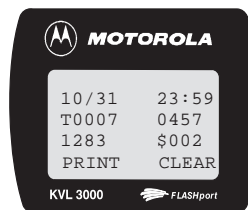
The KVL 3000 may be connected to a COM port on a PC (typically a laptop) and transfer the log records to the PC. The records may then be printed from the PC or saved on the PC as a file.

Important! A communications program (such as PROCOMM) must be running on the PC in order to transfer log records.

1. Connect a cable between the KVL 3000 RS-232 port and a COM port on the PC (typically COM1).




2. Launch a communications program on the PC (such as PROCOMM or equivalent). Set up the program as follows:
 - No parity
 - 8 bits
 - 1 stop bit
 - Translate line feeds <LF> to Carriage Return and Line Feed <CR> <LF>
 - 80 character width
3. Navigate to and select **Log** in the *Main Menu*. The following screen will appear:



— continued on next page —

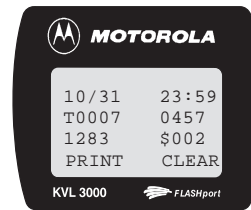
Transferring Log Records to a PC (continued)


4. Press  to select **PRINT**. The log records will be transferred to the open communications window on the PC.
5. When finished, you may either print the log records to a printer connected to the PC, or save the log records as a file on the PC.

Printing Log Records to a Serial Printer

The log records may be printed directly to a serial printer connected to the *KVL 3000*.

1. Connect an appropriate cable between the *KVL 3000* RS-232 port and a serial printer.
2. Navigate to and select **Log** in the *Main Menu*. The following screen will appear:



3. Press  to select **PRINT**. The log records will be printed to the serial printer.

Log Record Format

When printing to a serial printer or to a PC, the log records are formatted as shown below:

Typical Log Record

DATE	TIME	GROUP	KVLSLOT	KEYLID	UNITID	UNITPID
10/19/98	21:45	00	S0001	1aa1	0031	\$011
10/19/98	20:10	00	T0435	1311	0031	\$00f
10/1/98	09:39	00	T0034	1aa1	0031	\$00d
09/16/98	14:59	00	T0001	1aa1	0031	\$007
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
06/28/98	08:31	00	T0050	1aa1	0031	\$00a

chapter contents

Interpreting Error Messages **2**

Performing Resets **10**

Interpreting Error Messages

Introduction

Two types of error messages are provided by the *KVL 3000*.

- **Operator Error and Status Messages** — Displayed when operator performs an illegal or disallowed action (such as entering an invalid value, entering a duplicate LID, etc.), or during normal operation in response to an operator-initiated function (e.g., attempting to load a key to a target device).
- **Internal Error Messages** — When this type of error occurs, the display will show KEY LOAD FAILED (or other generic error message). Press and hold the **Del/Shift** key, then press the **E** key to display a more detailed error message.

Operator Error and Status Messages

The table on the facing page shows all possible *Operator Error and Status Messages* presented in alphabetical order, along with probable causes and remedies.

Operator Error and Status Messages

Error/Status Message	Probable Cause and Remedy
BAD GROUP MAP CRC	Probable Cause(s): 1) Group map data corrupted Remedy(s): 1) Enter Re-enter the Group Map; if problem persists, return to service center
BOTH PASSWORDS CAN NOT BE SAME	Probable Cause(s): 1) Attempt was made to enter the same password for both Supervisor and Operator Remedy(s): 1) Enter a unique password that is different from Supervisor (or Operator)
CANNOT LOAD EMPTY KEY	Probable Cause(s): 1) Attempt was made to load a key to a target device from a key location in the <i>KVL 3000</i> that has no key entered Remedy(s): 1) Enter a key into the empty <i>KVL 3000</i> key location, then load the key into the target device
CANNOT PORT! KID EXISTS FOR ALGO IN ASTRO 25!	Probable Cause(s): 1) You have attempted to port an ASN key to <i>ASTRO 25</i> and a key of the same algo type and KID already exists in <i>ASTRO 25</i> . Remedy(s): 1) Delete the <i>ASTRO 25</i> key that has the same KID.
CANNOT PORT THIS ALGO TO ASTRO 25!	Probable Cause(s): 1) You have attempted to port an ASN key to <i>ASTRO 25</i> that has an algorithm type not supported in <i>ASTRO 25</i> (e.g., DVP is supported only in ASN and cannot be ported to <i>ASTRO 25</i>). Remedy(s): 1) You cannot port this key.
CKR ENTERED CANNOT BE ASSIGNED TO THIS KEYTYPE	Probable Cause(s): 1) You have attempted to port an ASN key to <i>ASTRO 25</i> and have assigned a CKR that does not match the key type (i.e., Traffic Keys must be ported as TEKs with a CKR range of 1–4095; Shadow Keys must be ported as KEKs with a CKR range of 61440–65535) Remedy(s): 1) Select a CKR that matches the type of key being ported.

Error/Status Message	Probable Cause and Remedy
GROUP TRANSFER FAILED	Probable Cause(s): 1) the group load operation has failed for some reason. Remedy(s): 1) Press/hold Del/Shift key, then press E key to display a more detailed error message
KEY LOAD FAILED	Probable Cause(s): 1) A key load operation has failed for some reason Remedy(s): 1) Press/hold Del/Shift key, then press E key to display a more detailed error message
KMC TO KVL DOWNLOAD BAD UPLOAD	Probable Cause(s): 1) Data sent from KVL 3000 to KMC was corrupt or incomplete Remedy(s): 1) Make sure modem connections are good
KMC TO KVL DOWNLOAD MODEM ERROR	Probable Cause(s): 1) Modem could not be initiated when attempting a dial-up connection Remedy(s): 1) Make sure modem power is on, and the modem connections are good
KMC TO KVL DOWNLOAD NO ANSWER	Probable Cause(s): 1) KVL 3000 has been programmed with an incorrect KMC dial-up phone number 2) KMC's modem is down Remedy(s): 1) Navigate to KMC in the MAIN menu, then select MODEM and enter the proper phone number 2) Check with KMC operator
KMC TO KVL DOWNLOAD NO CARRIER	Probable Cause(s): 1) KVL 3000 has been programmed with an incorrect KMC dial-up phone number 2) KMC's modem is down Remedy(s): 1) Navigate to KMC in the MAIN menu, then select MODEM and enter the proper phone number 2) Check with the KMC operator
KMC TO KVL DOWNLOAD NO DIALTONE	Probable Cause(s): 1) KVL 3000 modem connection is faulty Remedy(s): 1) Check all connections between the KVL 3000, the modem, and the phone line

Error/Status Message	Probable Cause and Remedy
KMC TO KVL DOWNLOAD NO MDC ID	Probable Cause(s): 1) <i>KVL 3000</i> has not been programmed with an MDC ID Remedy(s): 1) Navigate to <i>ID</i> in the <i>CONFIG</i> menu, then enter the proper MDC ID
KMC TO KVL DOWNLOAD INVALID PCMCIA MODEM	Probable Cause(s): 1) PCMCIA modem could not be initiated when attempting a dial-up connection Remedy(s): 1) Make sure modem is compatible (e.g., single function PCMCIA only)
KMC TO KVL DOWNLOAD NO PHONE #	Probable Cause(s): 1) <i>KVL 3000</i> has not been programmed with the KMC's dial-up phone number Remedy(s): 1) Navigate to <i>KMC</i> in the <i>MAIN</i> menu, then select <i>MODEM</i> and enter the KMC's dial-up phone number
KMC TO KVL DOWNLOAD NUMBER BUSY	Probable Cause(s): 1) KMC's dial-up phone line is busy Remedy(s): 1) Attempt the modem connection after waiting for a few minutes
KMC TO KVL DOWNLOAD REQ DENIED	Probable Cause(s): 1) Download request was denied by KMC Remedy(s): 1) Make sure that particular <i>KVL 3000</i> has been set up properly with the KMC (consult KMC operator)
KMC TO KVL DOWNLOAD TIMED OUT	Probable Cause(s): 1) Download was started and then interrupted (possibly by phone line or modem drop-out) Remedy(s): 1) Reestablish the connection and retry the download
NO ALGO AVAILABLE	Probable Cause(s): 1) Encryption IC in <i>KVL 3000</i> is not programmed properly Remedy(s): 1) Return <i>KVL 3000</i> to service center for reprogramming

Error/Status Message	Probable Cause and Remedy
NO RESPONSE FROM TARGET	Probable Cause(s): <ol style="list-style-type: none"> 1) Faulty Keyload Cable or connection 2) Target device is turned off 3) Target device is incompatible with <i>KVL 3000</i> Remedy(s): <ol style="list-style-type: none"> 1) Ensure proper keyload cable connections at each end; try known good keyload cable 2) Turn target unit power on 3) Make sure target device is compatible with <i>KVL 3000</i>
NOT A VALID VALUE	Probable Cause(s): <ol style="list-style-type: none"> 1) Entry is out of acceptable range Remedy(s): <ol style="list-style-type: none"> 1) Refer to manual and re-enter
NOT ALLOWED KMC MODE ACTIVE	Probable Cause(s): <ol style="list-style-type: none"> 1) Attempt to delete the log was made while <i>KVL 3000</i> has KMC mode turned on Remedy(s): <ol style="list-style-type: none"> 1) Navigate to <i>KMC</i> in <i>CONFIG</i> menu and turn <i>KMC USAGE Off</i>; you may now delete the log
NOT IN SUPERVISOR MODE	Probable Cause(s): <ol style="list-style-type: none"> 1) Not in Supervisor mode Remedy(s): <ol style="list-style-type: none"> 1) Power cycle <i>KVL 3000</i>, then enter Supervisor password when prompted for password
NOT A VALID KEY	Probable Cause(s): <ol style="list-style-type: none"> 1) The key entered is not valid according to the algorithm selected. Remedy(s): <ol style="list-style-type: none"> 1) Re-enter key or check with your Security Officer.
NO USK	Probable Cause(s): <ol style="list-style-type: none"> 1) Unique Shadow Key (USK) has not been entered into (or has been erased from) the <i>KVL 3000</i> Remedy(s): <ol style="list-style-type: none"> 1) Enter USK (typically assigned by Crypto/Security Officer) for each algorithm supported by the <i>KVL 3000</i>
OFFSET OUT OF RANGE	Probable Cause(s): <ol style="list-style-type: none"> 1) While entering an offset value for a Group Map, the value entered exceeds the acceptable range Remedy(s): <ol style="list-style-type: none"> 1) Enter an offset value within range (0 thru 63)

Error/Status Message	Probable Cause and Remedy
SHARE ALL FAILED	Probable Cause(s): 1) Sharing has failed for some reason. Remedy(s): 1) Press/hold Del/Shift key, then press E key to display a more detailed error message
WRONG PARITY	Probable Cause(s): 1) Key entered into <i>KVL 3000</i> has incorrect parity Remedy(s): 1) Make sure key to be entered is correct, then re-enter the key

Interpreting Error Messages (continued)

Internal Error Messages

When this type of error occurs, the display will show KEY LOAD FAILED (or other generic error message). Press and hold the **Del/Shift** key, then press the **E** key to display a more detailed error message.

For most of the detailed error messages, the cause is a faulty cable connection between the *KVL 3000* and the target device. Make sure the connection is good and try the operation again. If it still fails, contact your service center.

However, three of the detailed messages (related to sharing keys between two KVLs) have other causes and remedies. These error messages are shown on the facing page, along with probable causes and remedies.

Internal Error Messages

Internal Error Message (Press Shift–E)	Probable Cause and Remedy
SHARE ENCRYPTION MISMATCH	Probable Cause(s): 1) The two KVLs have different algorithms Remedy(s): 1) Sharing can only be performed between two KVLs with compatible algorithms; otherwise, sharing is not possible
SHARE KEY RANGE EXCEEDED	Probable Cause(s): 1) The source KVL 3000 is attempting to share a key in a slot location that is not supported in the target KVL (e.g., an older model KVL that only supports 16 keys) Remedy(s): 1) Move the key to another slot location in the source KVL 3000 that is within the target KVL's range
SHARE SYSTEM KEY MISMATCH	Probable Cause(s): 1) DVI-XL system keys must be the same in the source and target KVL 3000s (i.e., DVI-XL system keys can not be shared) Remedy(s): 1) Program the system key (the same key as in the source KVL) into the target KVL

Performing Resets

Note For KVL 3000s equipped for dual mode operation (ASN and ASTRO 25), note that re-setting also erases ASTRO 25 keys, UKEs, and Key Groups.

Introduction

Resetting causes the KVL 3000 to return to factory settings (i.e., erases the USK, all stored keys, Group Maps, Log Records, passwords, and resets the configuration settings to the factory defaults).

Performing Reset

1. Press and hold **Del/Shift**, then press the **Enter** key. The following screen will appear:



2. Use the ☐ key to select **YES**. The following confirmation screen appears.



3. Use the ☐ key to select **OK**. A reset process takes from a few seconds to about a minute.

◆ End of This Procedure ◆

Chapter 1 Quick Start Instructions

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Quick Start Procedures **3**

About these Quick Start Instructions

For those of you who are already familiar with the *KVL 3000*, these *Quick Start Instructions* provide an abbreviated procedure for preparing your *KVL 3000* for use and entering and loading a single encryption key from the *KVL 3000* to a target device.

These *Quick Start Instructions* describe only the most basic scenario of entering and loading a key. Refer to the appropriate chapters in this manual for detailed step-by-step procedures required for special cases (such as using the *KVL 3000* with devices in OTAR systems).

We also encourage you to read the rest of this manual to learn how to make the most efficient use of the many features provided by the *KVL 3000* (such as using passwords, retrieving log records, using key groups, transferring keys between *KVL 3000*s, and configuring user-defined settings).

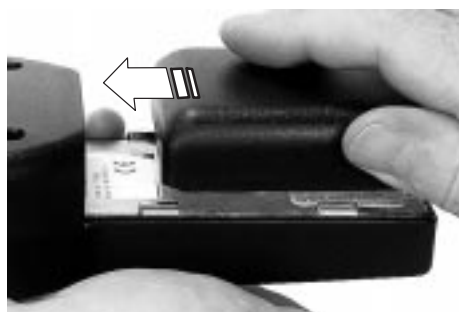
Quick Start Procedures

Note Steps 1 and 2 need be performed only once. Steps 3 thru 5 are performed on a per key basis.

1. Install the coin-cell battery (Chapter 2, behind *All Models* tab).



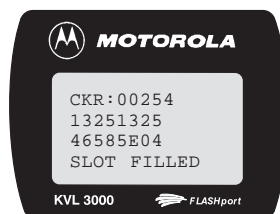
2. Charge and install the rechargeable main battery (Chapter 2, behind *All Models* tab).



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Quick Start Procedures

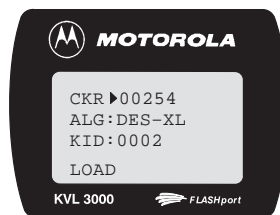
3. Enter an encryption key into the *KVL 3000* memory (Chapter 4, within this tab).



4. Connect the *KVL 3000* to a target device (e.g., radio).



5. Transfer (load) the key to the target device (Chapter 5, within this tab).



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Using the Menu System	6

Description of KVL 3000

The *KVL 3000* Key Variable Loader is a battery-powered portable unit used to create, store, and transfer encryption keys used by Motorola's secure communications products (e.g., radios, DIUs, CIUs, RNCs, etc.). The *KVL 3000* (shown below) is comprised of a keypad, a 4-line, 12-character Liquid Crystal Display (LCD), multiple I/O ports for connecting to external equipment, a rechargeable battery, and sophisticated internal electronics and software.



KVL 3000 Key Variable Loader

Key Features

The *KVL 3000* offers the following features:

- Password Protection (Supervisor and Operator security levels)
- Secure storage of encryption keys
- Menu System User Interface — allows system-specific and user settings to be configured
- Supports software upgrades via PCMCIA Card slot and Motorola's FLASHport™ technology
- Supports the following encryption algorithms:
 - DES (XL and OFB)
 - DVP-XL
 - DVI-XL

Note that the *KVL 3000* can support any single algorithm, or DES (XL and OFB), and one other algorithm (multi-algorithm KVLs).

- Supports the following encryption protocols:
 - 9.6 kbps Secure APCO Project 25 (IMBE Vocoder)
- Supports the following encryption standards:
 - FIPS 46–2
 - FIPS 81
 - FIPS 140–1 Level 1
- RS232 and Keyload I/O Ports
- Supports serial and PCMCIA modems
- Supports sharing keys between two KVLs
- Event Log maintains running record of the KVL load and zeroize activities
- Supports transfer of keys to/from a Key Management Facility (KMF) using “Store and Forward” feature (see Chapter 7 within this tab)

Using the KVL 3000

Overview of Encryption Concepts

Secure communications systems are designed to provide coded (“encrypted”) voice and data signals between some or all links in the system (including RF links and network links). In order to do this, each device (e.g., radio, fixed encryption unit) is loaded with a multi-digit encryption variable (a “key”). This key is used by the encryption algorithm (e.g., DES, DVI-XL, etc.) built into the device to mathematically “encrypt” all transmitted voice and data signals, and decode all “encrypted” voice and data signals received.

Only devices in the system with the same algorithm and encryption key can decode the encrypted signal and carry on communications with each other. Talk groups can therefore be created by controlling the assignment of encryption keys to specific groups of radios.

Types of Keys

The *KVL 3000* stores two basic types of encryption keys:

- **Traffic Encryption Keys (TEK)** — Used by subscriber units to encrypt/decrypt voice and data communications
- **Key Encryption Keys (KEK)** — Used by the KMF to provide an additional level of encryption to the encryption keys when transferring keys to secure subscriber devices (over the air) or indirectly via the *KVL 3000* (using *Store and Forward*)

Both types of keys are stored in the *KVL 3000* memory in an encrypted format and are protected from tampering.

Using the KVL 3000 (continued)

Overview of Entering and Loading Keys

Encryption keys are entered by the user into the *KVL 3000* memory locations [organized by Common Key Reference (CKR) number]. The keys may then be transferred (loaded) to a target device, such as a secure radio.

A two-step process is required for most encryption keys:

- Create (enter) the multi-digit encryption key into the *KVL 3000* memory; keys can be entered manually via the keypad, or downloaded from a KMF
- Connect the *KVL 3000* to a target device (e.g., radio) and transfer the key to the target device (either manually or using the *Store and Forward* feature)

Using the Menu System

Menu Architecture

The KVL 3000 Menu System is organized as shown on page 2–9. The menu selections for the *Main Menu* (shown on the facing page) are summarized below. All other menu selections are described in the appropriate chapters in this section of the manual.

MAIN Menu

- **UPDATE** — Press to automatically load key messages addressed to the target device by the KMF (p/o *Store and Forward* feature)
- **LIST** — Provides access to screen used for displaying list of target devices requiring an update (as downloaded from the KMF, p/o *Store and Forward* feature)
- **KMF** — Provides access to screen used for communicating with a KMF, as well as setting up parameters used when communicating with a KMF
- **TARGET** — Provides access to screen used for target operations
- **KEYS** — Provides access to screen used for entering (and deleting) keys into the KVL 3000
- **GROUPS** — Provides access to screen used for creating/modifying/deleting Key Groups
- **CONFIG** — Provides access to Configuration Menu (see **Chapter 3**)
- **LOG** — Provides access to screen used for viewing/printing/clearing log entries
- **PORT** — Provides access to screen used for copying encryption keys from ASN storage (stored by PIDs) to ASTRO 25 storage (stored by CKRs) and vice versa

— continued on page 2–8 —

MAIN MENU								
UPDATE	LIST	KMF	TARGET	KEYS	GROUPS	CONFIG	LOG	PORT
Chapter 7	Chapter 7	Chapter 7	Chapter 5	Chapter 4	Chapter 4	Chapter 3	Chapter 8	(See Note 1) Migration

Notes

1. The PORT menu selection appears only on KVL 3000 models that are equipped with **both** X795 ASN Operation and U239 ASTRO 25 Operation options.

Using the Menu System (continued)

Navigating Through the Menus

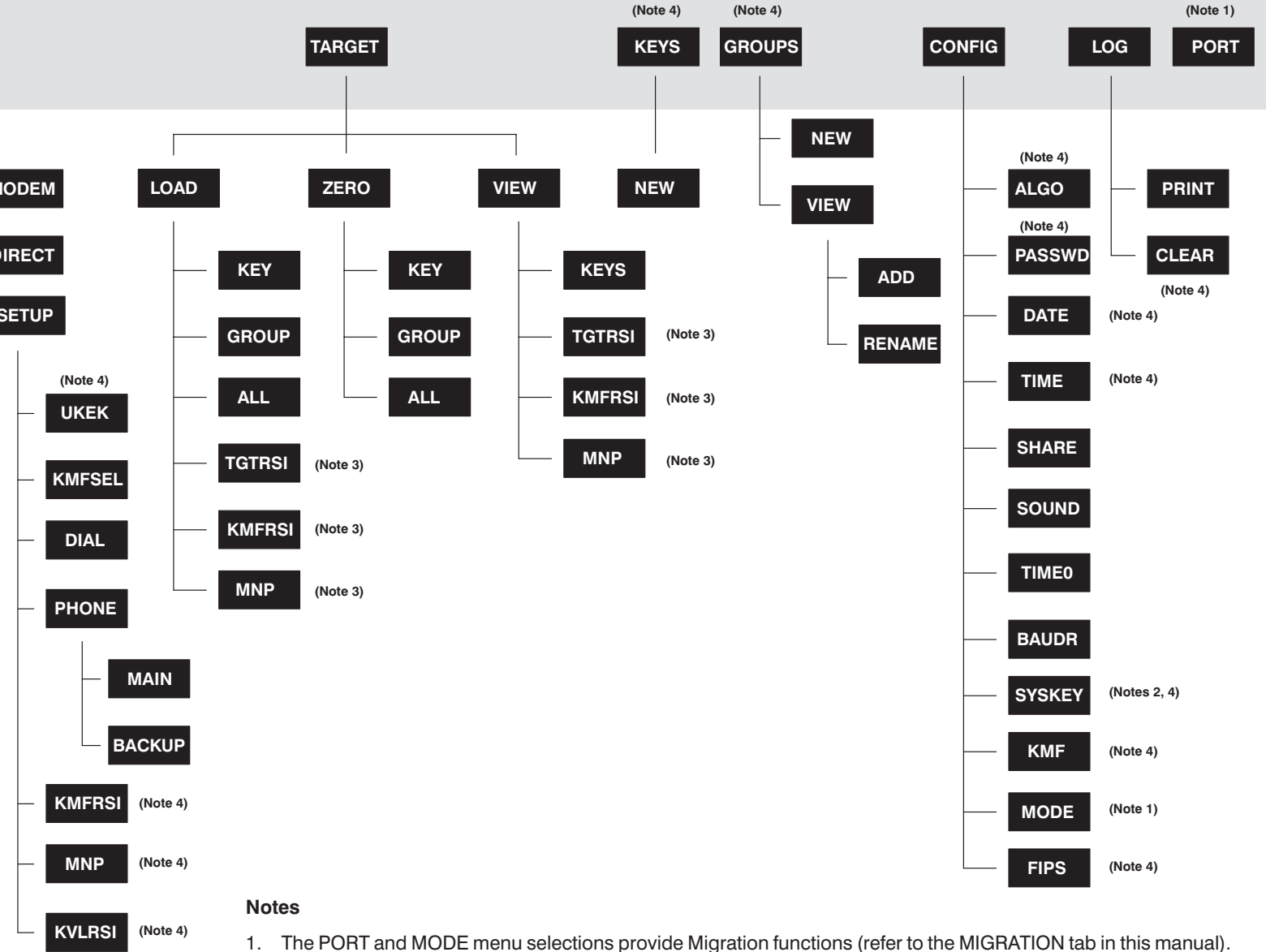
Each time you power up the *KVL 3000* in *ASTRO 25* mode, the display shown below appears. The title **ASTRO 25** displays to indicate that you are in the *Main Menu*. The two choices at the bottom of the display (**UPDATE** and **LIST**) are the first two items in the *Main Menu*.



To scroll through the *Main Menu* choices, press the ◀ or ▶ keys. The menu is constructed as a continuous loop; therefore, repeatedly pressing ◀ or ▶ scrolls the menu from start to finish, then back to start.

To select a menu choice, press the softkey (◻) that is directly below the choice. The display will show the screen corresponding to the menu choice.

To “back out” of a menu, press the **Esc** key. Repeatedly pressing this key will eventually return you to the initial *Main Menu* screen.



Chapter 3 Performing Initial Programming

chapter contents

Perform Initial Programming **2**

Perform Initial Programming

Introduction

Before using your *KVL 3000* to enter and load encryption keys, several parameters that determine how the *KVL 3000* operates can be programmed. The parameters are divided into two categories:

- User Preference
- System Dependent

Instructions for programming these parameters begin on the next page.

Note *Many of the parameters described in this chapter are also accessible from the CONFIG menu in ASN operating mode. Making changes to one of these common parameters from either ASN or ASTRO 25 operating mode affects the setting for both modes. For example, if you are in ASTRO 25 mode and change the Power-Down Timeout setting (TIMEO) to 60 seconds, the timeout will also be 60 seconds when in ASN operating mode.*

The common parameters are as follows:

- **PASSWD** (setting Supervisor and Operator passwords)
- **DATE** (setting month, day, year)
- **TIME** (setting hours, minutes, seconds)
- **SHARE** (on or off)
- **SOUND** (on or off)
- **TIMEO** (setting timeout period in seconds)
- **BAUDR** (selects baud rate for modem communications)
- **FIPS** (on or off)
- **SYSKEY** (allows System Key to be entered; for DVI-XL algorithms only)
- **DIAL** (setting Tone or Pulse dialing)

Perform Initial Programming (continued)

User Preference Parameters

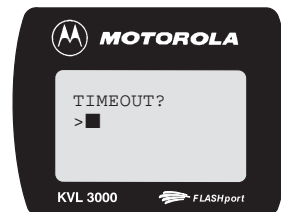
The parameters and settings in this category are not required for operation of the *KVL 3000*, but instead provide a way of customizing certain functions to suit each individual user.

Set Power-Down Timeout — The *Power-Down Timeout* feature allows you to program a time period (from 30 to 255 seconds). If the *KVL 3000* remains idle for the programmed time period, it will power down. To set the timer:

1. Navigate to the **CONFIG** menu, then navigate to and select **TIMEO**. The following screen will appear:



2. Press to select **EDIT**. The following screen will display. Enter the desired timeout time (in seconds). The range is from 30 to 255.



3. Press the **Enter** key to save the new value.

Perform Initial Programming (continued)



User Preference Parameters (continued)

Turn On/Off Display Backlighting — The *KVL 3000* powers up with display backlighting turned off. If desired, you may turn on backlighting at any time by pressing and holding the **Del/Shift** key, then pressing and releasing the **B** key, then releasing the **Del/Shift** key. Repeat to turn backlighting off.

Turn On/Off Sounds — The *KVL 3000* emits a tone each time a keypad button is pressed. Also, tones are emitted during certain operating conditions (e.g., prior to the timeout timer expiring). You can turn sounds on and off as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **SOUND**. The following screen will appear:



2. Use the  keys to select **ON** or **OFF**, as desired. The  icon will display to indicate that sounds are turned off.

Perform Initial Programming (continued)

Note The KVL 3000 can support the following combinations of algorithms:

DES-OFB & DES-XL
or
 DVI-XL
or
 DVP-XL
or
 DES-OFB, DES-XL, &
 DVI-XL
or
 DES-OFB, DES-XL, &
 DVP-XL

User Preference Parameters (continued)




Enable/Disable Algorithms — The KVL 3000 is capable of supporting multiple encryption algorithms (see sidenote), depending on the options ordered at the time of purchase. Selecting **ALGO** accesses a screen in which you can turn one or two of the algorithms off (requires multi-algorithm KVL 3000). Turning an algorithm off eliminates the step of specifying an algorithm when entering keys (Chapter 4). This streamlines the process of entering keys of the same algorithm type.

Note *The KVL 3000 must have at least one algorithm enabled. You can not turn off the algorithm in a single algorithm KVL 3000. You can not turn off all three algorithms in a multi-algorithm KVL 3000.*

To turn an algorithm off ...

1. Navigate to the **CONFIG** menu, then navigate to and select **ALGO**. The following screen will appear (shown with DES-XL algorithm):



2. Use the  or  keys to select the desired algorithm. Then use the  key to select **OFF** to turn the algorithm off.

Perform Initial Programming (continued)


User Preference Parameters (continued)

Set Time and Date — The *KVL 3000* contains an internal real time clock that is used to timestamp (with date and time) the log entries. If you wish to have these entries timestamped, you must set the time and date. The clock will continue to run using power from the 3 V coin-cell battery, even when the *KVL 3000* main power is turned off.

To set the time ...

1. Navigate to the **CONFIG** menu, then navigate to and select **TIME**. The following screen will appear:



2. Use the  key to select **EDIT**. The following screen will appear.



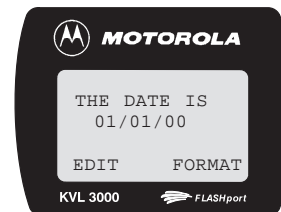
3. Using the keypad, enter the hours and press **Enter**. Repeat for minutes and seconds. (The clock operates in 24-hour military-style format.)




Perform Initial Programming (continued)

User Preference Parameters (continued)

To set the date ...


1. Navigate to the **CONFIG** menu, then navigate to and select **DATE**. The following screen will appear:

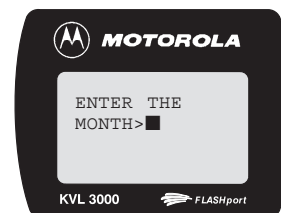


Note The KVL 3000 supports North American and European date formats. Use the  key to select **FORMAT**, then use the  or  keys to select the desired date format (US or EUROPE).

For example:

US = 12/25/98; **Europe** = 25/12/98

2. Use the  key to select **EDIT**. The following screen will appear.



3. Using the keypad, enter the month and press **Enter**. Repeat for date and year.

Perform Initial Programming (continued)

User Preference Parameters (continued)

Set Up Passwords — The KVL 3000 provides two levels of security access, **Supervisor** and **Operator**. The Supervisor has access to all functions and features. The Operator has access to a limited set of functions and features (see Menu Tree on page 2–9). Without password protection, all users have access to all of the KVL 3000 functions.


Note If FIPS is turned on, passwords are required.

Note You can not set just Supervisor or Operator passwords, but must set both if password feature is desired.

To create the passwords, perform the following:

1. Navigate to the **CONFIG** menu, then navigate to and select **PASSWD**. The following screen will appear:



2. Use the  key to select **EDIT**. The following screen will appear.



— continued on next page —

Perform Initial Programming (continued)

Note *Operator password and Supervisor password must be different from each other.*

User Preference Parameters (continued)

3. Enter the desired Supervisor password. The password must contain 6 characters using any of the keypad buttons 0 thru F. When finished, press the **Enter** key.
4. Repeat for the Operator password. The following screen will confirm your password entries. Whenever the KVL 3000 is powered up, a password will be required before operating the unit.



Important Note *If the Supervisor password is forgotten, a reset (see page 9–11) must be performed before the KVL 3000 can be used again. Because a reset erases all stored keys and returns the KVL 3000 settings to the factory defaults, you are strongly encouraged not to forget your password.*

If the Operator password is forgotten, the Supervisor can simply assign a new Operator password (overwriting the old password).


Perform Initial Programming (continued)

User Preference Parameters (continued)

Turn Sharing On/Off — In addition to loading keys into target devices, the *KVL 3000* can also “share” its keys with another *KVL 3000*. In order to share keys, the sharing feature must be turned on in both the source and target KVL. (Refer to **Chapter 6** for details on the sharing feature.) Turn Sharing on as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **SHARE**. The following screen will appear:



2. Use the  key to select **ON** (or **OFF**), as desired.

Perform Initial Programming (continued)

System Dependent Parameters

The parameters and settings in this category must be set depending on the particular system in which the *KVL 3000* will be operating.

Turn KMF Mode On/Off (OTAR Only) — In order to communicate with a Key Management Facility (KMF) in an OTAR system, the *KVL 3000* must have the *KMF Mode* turned on. Turn *KMF Mode* on as follows:

1. Navigate to the **CONFIG** menu, then select **KMF**. The following screen will appear:



2. Press ☐ to select **ON** (or **OFF**) as desired.

Note Enabling KMF mode causes some menu items to become unhidden (such as *UPDATE*, *LIST*, and *KMF*). Refer to Menu Tree on page 2–9.

Perform Initial Programming (continued)




System Dependent Parameters (continued)

Select RS232 or Serial Port Baud Rate —


When using the KVL 3000 serial port to communicate with external equipment (such as a KMF, a printer for log printing, or an external modem), the proper baud rate must be selected. Select this baud rate as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **BAUDR**. The following screen will appear:



2. Press  to select **EDIT**. The following screen will display. Use the  or  keys to select the desired baud rate (choices are 2400, 9600, 19200, and 57600).

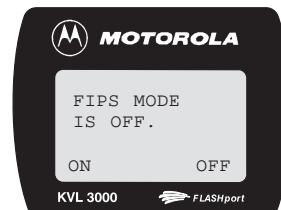


3. Press  to select **ACCEPT**.

**Perform Initial Programming
(continued)****System Dependent Parameters
(continued)**

Turn FIPS On/Off — When turned on, FIPS operation (available only with DES algorithm) causes the *KVL 3000* to operate in a mode that is compliant with the U.S. Federal Information Processing Standard (FIPS) 140-1 guidelines. This mode of operation enforces the use of passwords and activates tamper protection. If tampered with (e.g., back cover removed), if the main battery is dead, if the main battery is removed while the *KVL 3000* is on, or if the main battery is removed for an extended period of time (i.e., several minutes), all key information will be erased. With FIPS operation turned off, tampering will not cause the key information to be erased. Turn FIPS operation on as follows:

1. Navigate to the **CONFIG** menu, then navigate to and select **FIPS**. The following screen will appear:



2. Press ☐ to select **ON** (or **OFF**) as desired.

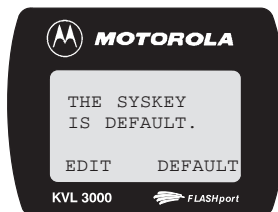
Perform Initial Programming (continued)

System Dependent Parameters (continued)

Enter System Key (DVI-XL Only) — The KVL 3000 requires a 128-digit System Key to communicate in DVI-XL systems. Each KVL 3000 is shipped from the factory with a default System Key. Change this key as described below.

Important *Changing the System Key causes all keys defined with the DVI-XL algorithm (including the UKEK) to be **erased**.*

1. Navigate to the **CONFIG** menu, then navigate to and select **SYSKEY**. The following screen will appear:



2. Press ☐ to select **EDIT**. The following warning screen will appear.

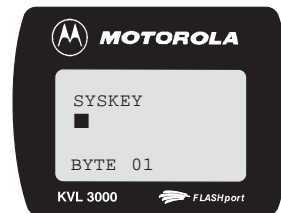


— continued on next page —

Perform Initial Programming (continued)

System Dependent Parameters (continued)

3. Press ☐ to select **YES**. The following screen will appear.



4. Enter the 128-digit (64 bytes) System Key. The display will show **SLOT FILLED** when completed. Press the **Enter** key.
5. The display will show **BUSY... ERASING KEYS** while the keys and UKEK are erased.
6. When finished, the following screen will be displayed to indicate that the new System Key was accepted (overwriting the previous System Key).



Notes ...

Chapter 4


Entering Keys into the *KVL 3000*

chapter contents


Entering Keys	2
Deleting Keys	5
Creating Key Groups	6
Modifying Key Groups	9

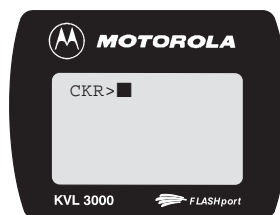
Entering Keys

To enter a Traffic Encryption Key (TEK) or a Key Encryption Key (KEK) into the KVL 3000 internal key database, perform the following:

1. Use the  key to select **KEYS** from the *Main Menu*. The following screen will appear (typical screen shown).



2. Use the  key to select **NEW**. The following screen will appear.



3. Use the keypad to enter the desired CKR for the key you wish to store (00005 in this example). When finished, press the **Enter** button. The following screen will appear.



Note Valid CKRs for TEKs are 1 thru 4095. Valid CKRs for KEKs are 61440 thru 65535.

— continued on next page —




Entering Keys (continued)

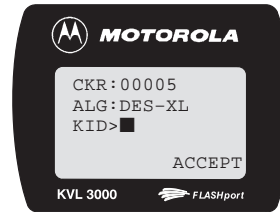
Note If you have only one algorithm enabled (using CONFIG menu), you will not be prompted for an algorithm.

Note The KVL 3000 will not accept keys of the same algorithm type with duplicate KIDs (i.e., each key of a particular algorithm type must have a unique KID).

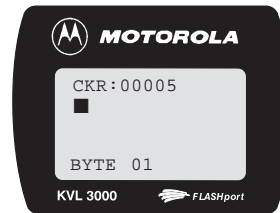
Note For DES keys only—As you enter each byte of the encryption key, it is checked by the KVL 3000 for validity. If you enter an invalid number, WRONG PARITY will flash in the display, and the invalid entry is ignored. Continue with the entry.

For non-DES keys—Encryption key validity is checked only after entire key is entered and the **Enter** key is pressed.

- Use the  or  keys to select the desired algorithm for this key. Then use the  key to select **ACCEPT**. The following screen will appear.



- Enter the 4-digit_{hex} Key ID (KID) for this key, then press the **Enter** key. The following screen will appear.



- Enter the encryption key using the keypad. The specific byte number is displayed as you enter the key numbers. When finished, the following screen will appear:



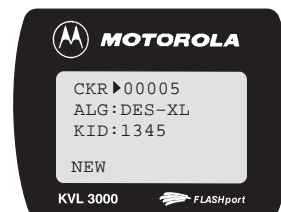
— continued on next page —

Entering Keys (continued)

7. Press the **Enter** key. The following screen will appear briefly to confirm your entry.




8. The following screen will then appear, showing the key you just created and awaiting entry of a new key (by selecting **NEW**).





◆ End of This Procedure ◆

Deleting Keys in KVL 3000


The delete feature allows you to erase an encryption key (TEK or KEK) stored in a specific CKR location in the KVL 3000's memory. Deleting permanently erases the encryption key currently stored in the location. The location is then considered to be "undefined" and may be used to hold another encryption key (using the *Entering Keys* procedure on page 4–2).

1. Use the  key to select **KEYS** from the *Main Menu*. The following screen will appear (typical screen shown).



2. Use the  or  keys to select the desired key location (CKR) you wish to delete (or use the keypad to directly enter the location number and press **Enter**).
3. Press the **Del/Shift** key. The following screen will appear, asking you to confirm the deletion.



4. Use the  key to select **YES** to delete the key (or **NO** to abort without deleting).

◆ End of This Procedure ◆

Creating Key Groups

Introduction

The *KVL 3000* provides a convenient feature called “key groups.” This feature allows you to associate several keys stored in the *KVL 3000* memory with a specified *Group Name*. You can then load the entire group of keys to the target device in a single operation. This is especially useful when loading the same group of keys to several target devices (e.g., a fleet of radios).

The *KVL 3000* supports an unlimited (except by memory capacity) number of groups, with each group consisting of TEKs, KEKs, or a combination of both.

Creating a Group

1. Navigate to and select **GROUPS** in the *Main Menu*. The following screen will appear:




— continued on next page —




Creating Key Groups (continued)

Note In addition to letters A–Z and numbers 0–9, the following special characters are also available for use in group names:

– / &

2. Use the  key to select **NEW**. The following screen will appear.







3. You will now create a name for this group. Use the  or  keys to sequence forward/backward through the alphabet until the desired letter is displayed. When the desired letter/number is displayed, press the  key to select --▶ and advance to the next entry space. Group names may contain from 1 to 7 letters/numbers. (You may also directly enter numbers 0–9 and letters A–F from the keypad. After the entry, the cursor automatically moves to the next space.)
4. With the desired group name displayed (TEST1 in this example), press the **Enter** key. The following (typical) screen will appear.



— continued on next page —

Creating Key Groups (continued)

Note Normally, each key added to the group will have a “defined” key (i.e., KID and key data) in the **KVL 3000** database. However, you can add keys to a group that do not have corresponding defined keys, or you may have deleted a key from the database that is a member of one or more groups. In these cases, an asterisk (*) is displayed after the CKR when viewing the keys in a group. This not only serves as an alert to the operator that no key data exists for a particular key, but can be used as an aid in zeroizing keys in targets. Refer to **Chapter 5 Loading Keys in Target Devices** for details.

5. You will now associate (add) the desired keys to this group (see sidenote). Use the  or  keys to select the first key you wish to add (or directly enter the CKR using the keypad), then use the  key to select **SELECT**. **Adding...** will briefly display.
6. Continue to add the desired keys to this group. When finished, use the  key to select **DONE**. The message **GROUP:XX CREATED WITH NN KEYS** briefly displays to confirm the group was successfully created. Then the following screen appears, from which you can **view** the keys in this group (see page 4–9) or create a new group.



◆ End of This Procedure ◆

Modifying Key Groups

Introduction

Once the *KVL 3000* contains one or more key groups, you may modify the groups in the following ways:

- **View** the Keys in a Group (page 4–9)
- **Add** Keys to a Group (page 4–11)
- **Delete Keys** from a Group (page 4–13)
- **Delete** a Group (page 4–15)
- **Rename** a Group (page 4–17)

Each of these tasks is described in detail in the following pages.

Viewing the Keys in a Group

1. Navigate to and select **GROUPS** in the *Main Menu*. The following screen will appear with the first group (alphabetically) displayed:



— continued on next page —

Modifying Key Groups (continued)

2. Use the ◀ or ▶ keys to sequence forward/backward (alphabetically by Group Name) through the groups in the *KVL 3000*. When the desired Group Name is displayed, use the ⏏ key to select **VIEW**. The following screen will appear.



3. Use the ◀ or ▶ keys to sequence forward/backward (by CKR) through the keys in this group. Note that for any CKR for which a defined key (KID and key data) does not exist, an asterisk (*) will follow the CKR number (see sidenote on page 4–8).




◆ End of This Procedure ◆

Modifying Key Groups (continued)

Adding Keys to a Group

1. Navigate to and select **GROUPS** in the *Main Menu*. The following screen will appear with the first group (alphabetically) displayed:



2. Use the  or  keys to sequence forward/backward (alphabetically by Group Name) through the groups in the *KVL 3000*. When the desired Group Name is displayed, use the  key to select **VIEW**. The following screen will appear.

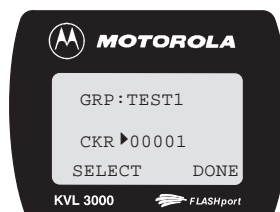


— continued on next page —

Modifying Key Groups (continued)

Note If desired, you may add "undefined" keys (i.e., CKR with no KID or key data) to a group for future use. Simply enter the CKR for the undefined key and press the **Enter** key. You will be prompted to confirm the addition of the undefined key. Select **YES**.

- Use the ☐ key to select **ADD**. The following screen will appear.



- Use the or keys to select the CKR for the key you wish to add (or enter the CKR directly from the keypad). Then use the ☐ key to select **SELECT**.

Adding... will briefly appear to confirm the addition of the key to the group.

- Add more keys if desired by repeating Steps 3 and 4. When finished, use the ☐ key to select **DONE**. The following screen will appear to confirm your actions. Note that you may press the **Esc** key (instead of selecting **DONE**) to abort your entries and return the Key Group to its original settings.






◆ End of This Procedure ◆

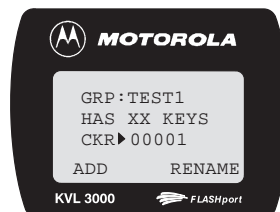
Modifying Key Groups (continued)

Deleting Keys from a Group

1. Navigate to and select **GROUPS** in the *Main Menu*. The following screen will appear with the first group (alphabetically) displayed:





2. Use the  or  keys to sequence forward/backward (alphabetically by Group Name) through the groups in the *KVL 3000*. When the desired Group Name is displayed, use the  key to select **VIEW**. The following screen will appear.



— continued on next page —

Modifying Key Groups (continued)

3. Use the  or  keys to select the CKR for key you wish to delete. Then press the **Del/Shift** key. The following screen will appear.



4. Use the  key to select **YES**.



◆ End of This Procedure ◆

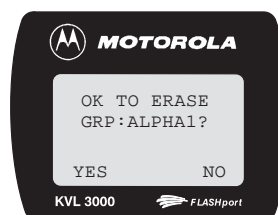
Modifying Key Groups (continued)

Deleting a Group

1. Navigate to and select **GROUPS** in the *Main Menu*. The following screen will appear with the first group (alphabetically) displayed:



2. Use the  or  keys to sequence forward/backward (alphabetically by Group Name) through the groups in the *KVL 3000*. When the desired Group Name is displayed, press the **Del/Shift** key. The following screen will appear.



— continued on next page —

Modifying Key Groups (continued)

3. Use the ☐ key to select **YES**. The message `GRP XX SUCCESSFULLY DELETED` will appear briefly to indicate that the group has been deleted from the *KVL 3000*.




◆ End of This Procedure ◆

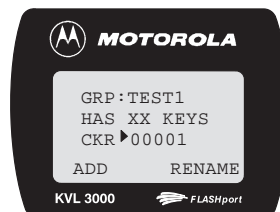
Modifying Key Groups (continued)

Renaming a Group

1. Navigate to and select **GROUPS** in the *Main Menu*. The following screen will appear with the first group (alphabetically) displayed:




2. Use the  or  keys to sequence forward/backward (alphabetically by Group Name) through the groups in the *KVL 3000*. When the desired Group Name is displayed, use the  key to select **VIEW**. The following screen will appear.



— continued on next page —

Modifying Key Groups (continued)

3. Use the  key to select **RENAME**. The following screen will appear.



4. Enter a new name as described on page 4–7. When finished, press the **Enter** key. The message **GRP XX RENAMED TO XX** will appear briefly to confirm the name change.

◆ End of This Procedure ◆

Chapter 5 Loading Keys into Target Devices

chapter contents

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Viewing Keys in Target Devices	16

Introduction


Loading keys from the *KVL 3000* to a target device (e.g., a secure radio) is performed from the **TARGET** menu selection in the *Main Menu*. Once in this menu, you have the option of performing the following three tasks:

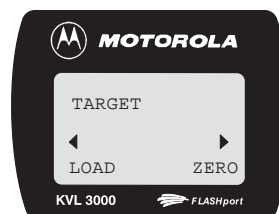
- **LOAD** Allows you to load keys (selected key, all keys in the *KVL 3000*, or by Key Group) into a target device connected to the *KVL 3000*.
- **ZERO** Allows you to zeroize keys (a selected key or all keys) in the target device; also allows you to zeroize the keys in the target device that correspond to the keys in a selected Key Group stored in the *KVL 3000*.
- **VIEW** Allows you to query the target device and display each key's information (CKR, ALGO, and KID) stored in the target device (use the ◀ or ▶ keys to scroll through the keys in the display)


Note The procedures in this chapter for loading keys into targets do not include key loading procedures to/from a KMF. All keyloading procedures between the *KVL 3000* and the KMF (including the *Store and Forward* feature) are described in **Chapter 7 Using KVL 3000 in OTAR Systems** within this tab.

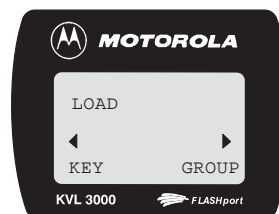
Loading Keys into Target Devices


Loading Selected Key

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:



3. Use the  key to select **LOAD**. The following screen will appear:



4. Use the  key to select **KEY**. The following (typical) screen will appear:



— continued on next page —

Loading Keys into Target Devices (continued)

5. Use the ◀ or ▶ keys to select the key you wish to load to the target radio (or use the keypad to directly enter the CKR, then press **Enter**).
6. Use the ⬢ key to select **LOAD**. The following screen will appear while the key is being loaded.




7. When finished, the following screen will appear to confirm that the key was loaded into the target radio. Use the ⬢ key to select **OK**.

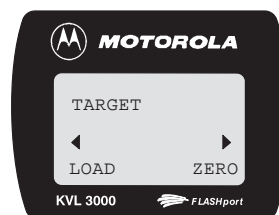



◆ End of This Procedure ◆

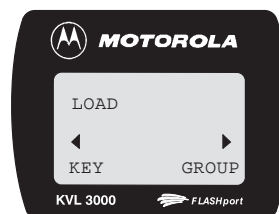
Loading Keys into Target Devices (continued)


Loading a Key Group

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:



3. Use the  key to select **LOAD**. The following screen will appear:






4. Use the  key to select **GROUP**. The following (typical) screen will appear:




— continued on next page —

Loading Keys into Target Devices (continued)

Note Since Key Groups may contain undefined keys (CKRs with no KID or key data), the number of keys loaded may differ from the number of keys in the Key Group. Only defined keys in a Key Group are actually loaded into a target device.

5. Use the  or  keys to select the Key Group you wish to load to the target radio.
6. Use the  key to select **LOAD**. The following screen will appear while the Key Group is being loaded.



7. When finished, the following screen will appear to confirm that the keys in the Key Group were loaded to the target radio. The number of keys loaded is also indicated (see sidenote). Use the  key to select **OK**.




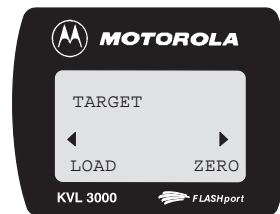
◆ End of This Procedure ◆


Loading Keys into Target Devices (continued)

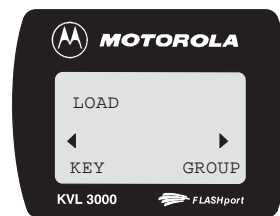
Note In order to load all keys from the KVL 3000 into the target device, the KVL 3000 and the target device must be equipped with the same algorithms.




Loading All Keys

1. Turn on the KVL 3000 and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the Main Menu. The following screen will appear:



3. Use the  key to select **LOAD**. The following screen will appear:



4. Use the  or  keys to display **ALL**, then use the  key to select it. The following (typical) screen will appear:



— continued on next page —

Loading Keys into Target Devices (continued)

5. Use the ☐ key to select **YES**. The following screen will appear while the keys are being loaded.



6. When finished, the following screen will appear to confirm that all the keys in the KVL 3000 were loaded to the target radio. The number of keys loaded is also indicated. Use the ☐ key to select **OK**.




◆ End of This Procedure ◆

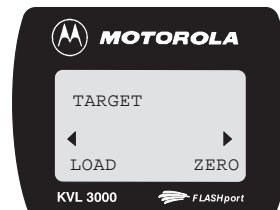
Zeroizing Keys in Target Devices


Introduction

The zeroize feature allows you to erase an encryption key(s) stored in a secure target device (e.g., radio). Zeroizing permanently erases the encryption key from the CKR memory location in the target device.

Zeroizing Selected Key

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:




3. Use the  key to select **ZERO**. The following screen will appear:






— continued on next page —

Zeroizing Keys in Target Devices (continued)

Note If there are no defined keys in the target, the message *NO KEYS FOUND IN TARGET* will be displayed.

4. Use the  key to select **KEY**. The KVL 3000 will query the target for the keys currently stored. The following (typical) screen will then appear:




5. Use the  or  keys to select the key you wish to zeroize in the target radio (or use the keypad to directly enter the CKR, then press **Enter**).
6. Use the  key to select **ZERO**. The following screen will appear while the key is being zeroized.



— continued on next page —

Zeroizing Keys in Target Devices (continued)


7. When finished, the following screen will appear to confirm that the key was zeroized in the target radio. Use the  key to select **OK**.

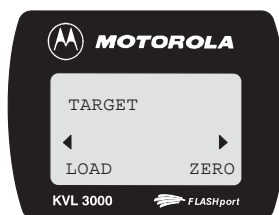



◆ End of This Procedure ◆

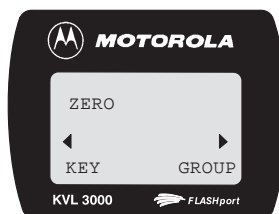
Zeroizing Keys in Target Devices (continued)


Zeroizing Using Key Groups

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:



3. Use the  key to select **ZERO**. The following screen will appear:






4. Use the  key to select **GROUP**. The following (typical) screen will then appear:




— continued on next page —

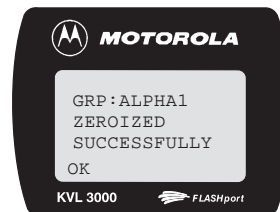
Zeroizing Keys in Target Devices (continued)

Note Key Groups may contain undefined (i.e., empty) keys. If such a Key Group is used to zeroize a target device, all CKRs (including any undefined ones) will be zeroized in the target device.

5. Use the  or  keys to select the Key Group you wish to use to zeroize keys in the target device. For example, if group ALPHA1 contains keys with CKR 1, 2, 5, and 15, then selecting group ALPHA1 will zeroize (in the next step) CKR 1, 2, 5, and 15 in the target device. CKR 1, 2, 5, and 15 in the KVL 3000 will not be affected.
6. Use the  key to select **ZERO**. The following screen will appear while the keys are being zeroized.




7. When finished, the following screen will appear to confirm that the keys in the target device that correspond to the keys in the selected Key Group were zeroized. Use the  key to select **OK**.

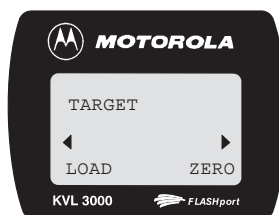



◆ End of This Procedure ◆

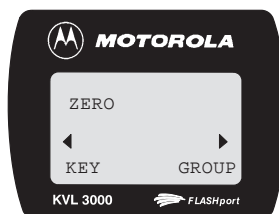
Zeroizing Keys in Target Devices (continued)




Zeroizing All Keys

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:



3. Use the  key to select **ZERO**. The following screen will appear:



4. Use the  or  keys to display **ALL**, then use the  key to select it. The following (typical) screen will then appear:



— continued on next page —

Zeroizing Keys in Target Devices (continued)

Note In OTAR, zeroizing All Keys erases all keys in the target, including the KLK (if used).

5. Use the ☐ key to select **YES**. The following screen will appear while the keys are being zeroized.




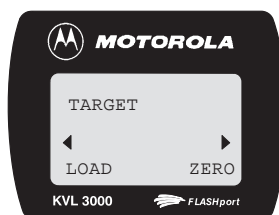
6. When finished, the following screen will appear to confirm that all of the keys in the target device were zeroized. Use the ☐ key to select **OK**.






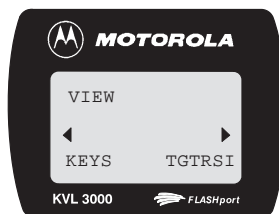
◆ End of This Procedure ◆

Viewing Keys in Target Devices

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:




3. Use the  or  keys to display **VIEW**, then use the  key to select it. The following screen will appear:





Note The screen shown at right is displayed if KMF mode is enabled (via CONFIG menu). If disabled, only KEYS appears as a menu choice.

— continued on next page —

Viewing Keys in Target Devices (continued)

4. Use the  key to select **KEYS**. The KVL 3000 will query the target device, retrieve a listing of the keys stored in the target device, and display the first key, as shown below.



5. Use the  or  keys to scroll through the key listing (or enter the key you wish to view using the keypad). Note that you can **only view** the list; adding and zeroizing may not be performed using the **View** function.

◆ End of This Procedure ◆

Notes ...

Chapter 6

Sharing Keys Between KVLs

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About Sharing	2
Setting Up Connections	3
Share All Keys	4
Share Selected Key	6
Share Key Groups and Associated Keys	8

About Sharing

Introduction

In addition to loading keys into target devices, the *KVL 3000* can also “share” its keys with another *KVL 3000*. For example, when finished with a *Share All* operation, the target *KVL 3000* will contain all of the TEKs, KEKs, and Key Groups as the source *KVL 3000*.

Sharing Scenarios

The following sharing scenarios are supported.

- **Share All** — The “source” *KVL 3000* can share all of its keys (including TEKs, KEKs, and Key Groups) with another *KVL 3000* (page 6–4).
- **Share Single Key** — The “source” *KVL* can share a selected key with another *KVL 3000* (page 6–6).
- **Share Key Group(s)** — The “source” *KVL 3000* can share its Key Groups (and the keys associated with these Key Groups) with another *KVL 3000* (page 6–8)

Things to Know Before Sharing

- Only key data and Key Groups are shared. *KVL 3000* configuration settings, the UKEK for each algorithm, and log records for the target *KVL 3000* remain unchanged.
- Sharing must be turned ON in both *KVL*s (using the **SHARE** setting in the **CONFIG** menu).
- In order to share single keys or Key Groups which contain DVI-XL keys, the System Keys of both *KVL*s must match.

Setting Up Connections

Introduction

In order to share keys between two KVLs, a KVL-to-KVL Transfer Cable (Model TKN8209) is required.

Connecting the *KVL 3000s*

Connect the transfer cable between the two KVLs as shown below.



Share All Keys

Note If sharing at least one DVI-XL key and the System Keys in both KVL 3000s do not match, a screen will appear prompting you to overwrite the target KVL's System Key with the source KVL's System Key. Select **YES** to proceed with the sharing operation. Note that old DVI-XL keys in the target KVL will be erased.

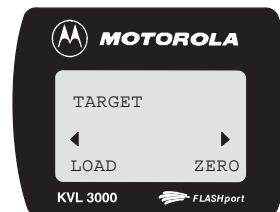
In this scenario, all TEKs and KEKs, as well as Key Groups (if present) are transferred from the source KVL 3000 to the target KVL 3000.


Important! In order to perform a Share All procedure, the target KVL 3000 must support the same algorithms (e.g., DES and DVI-XL, or DES and DVP-XL) as the source KVL (assuming there is at least one key defined for each algorithm).

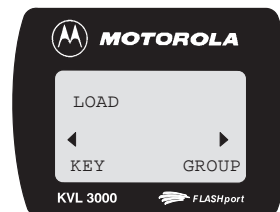
Example 1: The source KVL 3000 is equipped with DES-XL, DES-OFB, and DVP-XL, and there is at least one key defined for each algorithm. The target KVL 3000 must also be equipped with DES-XL, DES-OFB, and DVP-XL.

Example 2: The source KVL 3000 is equipped with DES-XL, DES-OFB, and DVP-XL, but there are keys defined only for DES-XL. The target KVL 3000 must also be equipped with at least DES-XL.

1. With both KVL 3000s turned on and connected via the transfer cable, navigate to and select **TARGET** in the Main Menu on the source KVL 3000. The following screen will appear:






2. Use the  key to select **LOAD**. The following screen will appear:




— continued on next page —


Share All Keys (continued)

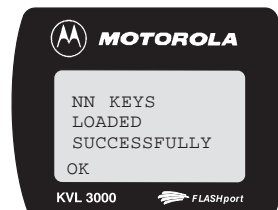
3. Use the  or  keys to display **ALL**, then use the  key to select it. The following (typical) screen will appear:



4. Use the  key to select **YES**. The following screen will appear while the keys are being loaded.



5. When finished, the source *KVL 3000* emits a success tone and displays the following screen to indicate a successful sharing operation. Use the  key to select **OK**.



◆ End of This Procedure ◆

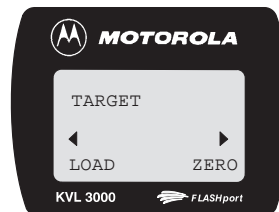
Share Selected Key


Note If sharing a DVI-XL key, the System Keys in both KVL 3000s must match in order to successfully complete the sharing procedure.

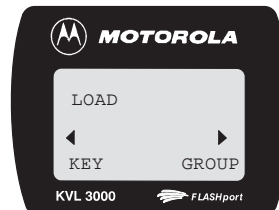
In this scenario, a specific TEK or KEK is shared from the source KVL 3000 to the target KVL 3000.


Important! In order to share a selected key, the target KVL must be able to support the algorithm of the key being shared.

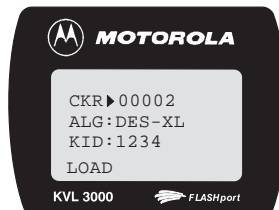
1. With both KVLs turned on and connected via the transfer cable, navigate to and select **TARGET** in the *Main Menu* of the source KVL 3000. The following screen will appear:



2. Use the  key to select **LOAD**. The following screen will appear:






3. Use the  key to select **KEY**. The following (typical) screen will appear:




— continued on next page —

Share Selected Keys (continued)

4. Use the  or  keys to select the key you wish to share with the target *KVL 3000* (or use the keypad to directly enter the location number, then press **Enter**).
5. Use the  key to select **LOAD**. The following screen will appear while the key is being loaded.



6. When finished, the source *KVL 3000* emits a success tone and displays the following screen to indicate a successful sharing operation. Use the  key to select **OK**.



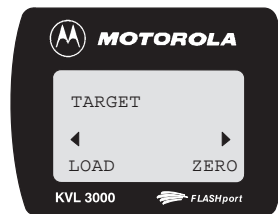
◆ End of This Procedure ◆


Share Key Group and Associated Keys

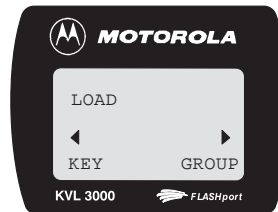
Note If sharing a Key Group that contains at least one DVI-XL key, the System Keys in both KVL 3000s must match in order to successfully complete the sharing procedure.


In this scenario, a specific Key Group (including Key Group Name and the associated keys) is shared from the source KVL 3000 to the target KVL 3000.

1. With both KVLs turned on and connected via the transfer cable, navigate to and select **TARGET** in the *Main Menu* of the source KVL 3000. The following screen will appear:



2. Use the  key to select **LOAD**. The following screen will appear:






3. Use the  key to select **GROUP**. The following (typical) screen will appear:




— continued on next page —

Share Key Group and Associated Keys (continued)

4. Use the  or  keys to select the Key Group you wish to share with the target *KVL 3000*.
5. Use the  key to select **LOAD**. The following screen will appear while the Key Group is being loaded.



6. When finished, the source *KVL 3000* emits a success tone and displays the following screen to indicate a successful sharing operation. Use the  key to select **OK**.



◆ End of This Procedure ◆

Notes ...

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Loading Keys from KMF to KVL (Direct Connection)	21
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Overview

Note Before using the KVL 3000 to perform tasks in an OTAR system, OTAR operation must be enabled by navigating to **KMF** in the **CONFIG** menu and selecting **ON**. Other settings are also required as described on page 7–4.

Introduction

The Motorola Over-the-Air Rekeying (OTAR) system is a secure communications system in which encryption keys can be sent to subscriber units via radio transmission (instead of directly connecting a KVL to load keys). This type of system provides added flexibility and convenience in managing and administering encryption keys.

One of the infrastructure components in an OTAR system is the Key Management Facility (KMF). The KMF is a Windows NT-based computer that is responsible for storing and managing the encryption keys for an OTAR system, as well as initiating key transmissions to the subscriber units.

Key Transfer Scenarios

The KVL 3000 can interface with the KMF to provide the following functions:

- **Transfer the encryption keys required by the OTAR system from the KVL 3000 to the KMF** — In this scenario, an operator loads the required keys into the KVL 3000, then connects the KVL 3000 to the KMF via a standard key loading cable and transfers the keys (one at a time) to the KMF for storage and management.

— continued on next page —

Overview (continued)

- **Download encryption keys from the KMF into the KVL 3000** — This scenario incorporates two methods of downloading keys:
 - Individual keys are downloaded to the *KVL 3000* key database, and must then be loaded directly into target devices. This method requires the *KVL 3000* operator to know the CKRs of the keys in the *KVL 3000* key database and manually load the proper keys to the corresponding target devices.
 - Utilizing the *ASTRO 25* feature known as *Store and Forward*, Key Management Messages (usually containing encryption keys) are downloaded to the *KVL 3000* which are in turn used to update target devices. The *KVL 3000* operator need not know the CKRs of the keys in the *KVL 3000* database, and the procedure to load the keys into the target devices is greatly simplified.

Each of these two methods may be used where over-the-air rekeying can not be performed (e.g., for subscriber radios that do not support over-the-air rekeying, radios that are out of range, or radios that have not yet been initialized). The download from the KMF to the *KVL 3000* may be performed either by direct cable connection or via a modem connection.

Setting Up KVL 3000 for KMF Operation

Introduction

Before using your *KVL 3000* to interchange keys with a KMF, several KMF-related parameters must be programmed. These are:

- **UKEK** Unique Key Encryption Key required per algorithm in the *KVL 3000* for OTAR systems; consists of a KID and Key Data
- **KMFSEL** Allows selection of *Main* or *Backup* KMF
- **DIAL** Allows selection of *Tone* or *Pulse* dialing when connecting via modem to a KMF
- **PHONE** Allows entry of Main and Backup KMF dial-up phone numbers for modem connections
- **KMFRSI** Allows entry of a 7-digit KMF Radio Set Identifier number
- **MNP** Allows entry of a 5-digit Message Number Period; provides additional rekeying security for OTAR systems
- **KVLRSI** Allows entry of a 7-digit KVL Radio Set Identifier number

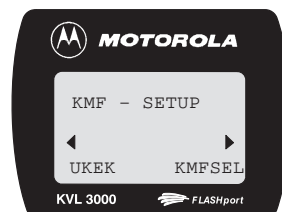
Instructions for programming these parameters begin on the next page.


Setting Up KVL 3000 for KMF Operation (continued)

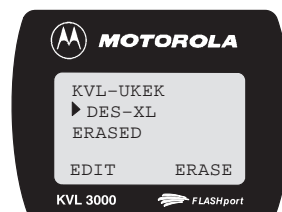
Important! *The UKEK needs to be entered only one time. Once entered, the UKEK is permanently stored in memory. The UKEK will be destroyed if FIPS is enabled and the KVL 3000 is opened or the Main Battery is removed for more than several minutes. The UKEK can also be deliberately cleared by using menu operations.*

Enter UKEK — For OTAR operation, a Unique Key Encryption Key (UKEK; functionally similar to the USK for ASN operation) must be programmed into the *KVL 3000* for each algorithm being used. Each UKEK is a multi-character key typically assigned by the Crypto/Security Officer for the system, and is used to communicate with other secure equipment (such as a KMF). The exact number of characters is determined by the algorithm.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:



2. Press  to select **UKEK**. The following screen will display.



— continued on next page —

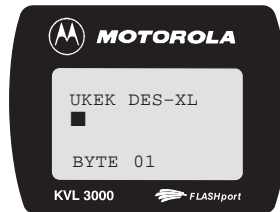
Setting Up KVL 3000 for KMF Operation (continued)

Important! *The exact same UKEK must also be assigned to the corresponding KVL record in the KMF database.*

3. Use the ◀ or ▶ keys to select the desired algorithm. Then use ⏎ to select **EDIT**. The following screen will appear.



4. Enter the 4-digit KID and press the **Enter** key. The following screen will appear.



5. Enter the multi-character UKEK (number of bytes determined by the particular algorithm) until **FILLED** appears. If the UKEK is correct, press the **Enter** key. If not, press the **Del/Shift** key to "back out" the digits and correct the UKEK entry, then press the **Enter** key.

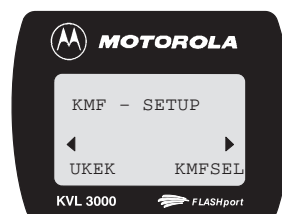
To erase the UKEK, select **ERASE** (instead of **EDIT**) in Step 3.

◆ **End of This Procedure** ◆

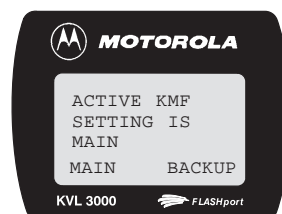
Setting Up KVL 3000 for KMF Operation (continued)

Select Main or Backup KMF — The KVL 3000 can support dial-up phone numbers for a Main and a Backup KMF. The **KMFSEL** setting determines which number is dialed when making a modem connection to a KMF.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:



2. Press ☐ to select **KMFSEL**. The following screen will display.



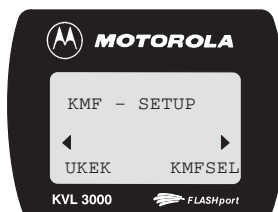
3. Use ☐ to select either **MAIN** or **BACKUP**. Press the **Esc** key to accept the setting and exit the menu.




◆ End of This Procedure ◆

Setting Up KVL 3000 for KMF Operation (continued)



Select Tone or Pulse Dialing — The *KVL 3000* can support Tone or Pulse dialing when making a modem connection to a KMF. Select the desired dialing method as follows.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:



2. Use the  or  keys to navigate to **DIAL**, then press  to select **DIAL**. The following screen will display.



3. Use the  or  keys to select either **TONE** or **PULSE**. Press the **Esc** key to accept the setting and exit the menu. (Note that this setting applies to both the *Main* and *Backup* KMF dial-up phone numbers.)

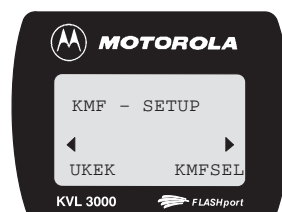
◆ End of This Procedure ◆

Setting Up KVL 3000 for KMF Operation (continued)

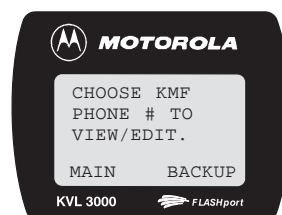
Enter Main and Backup KMF Phone Numbers

— The *KVL 3000* can support dial-up phone numbers for a Main and a Backup KMF. Enter the dial-up phone numbers as follows.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:




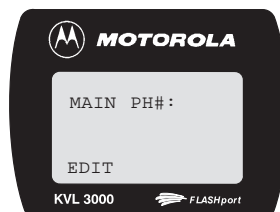
2. Use the ◀ or ▶ keys to navigate to **PHONE**, then press ◻ to select **PHONE**. The following screen will display.




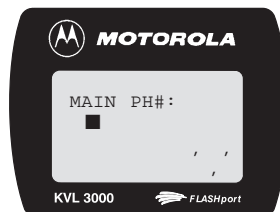
— continued on next page —

Setting Up KVL 3000 for KMF Operation (continued)

3. Use the  keys to select the phone number you wish to view (either **MAIN** or **BACKUP**). The following screen will appear (**MAIN** selected).



4. Press the  key to select **EDIT**. The following screen will appear.









5. Enter the dial-up phone number for the Main (or Backup) KMF. Be sure to include 1 and area code, if required.
6. When finished, press the **Enter** key to accept the phone number.

— continued on next page —

Setting Up KVL 3000 for KMF Operation (continued)

Hints and Tips for Entering Phone Numbers

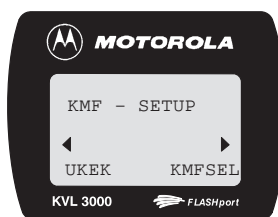
- Press the **Del/Shift** key to backspace and delete the digit to the left of the flashing cursor.
- Press the  key to insert a comma (,). Each (,) character represents a 2-second pause between digit strings. You may use these pauses to build dial-up numbers for credit or calling card calls. (You must experiment with your particular calling card service to determine the number of pauses needed and in which locations in the phone number string they must be placed. For example, a typical dialing scenario might be:
 - ① Dial Access Number
 - ② Pause 4 seconds (2 commas)
 - ③ Dial desired phone number
 - ④ Pause 2 seconds (1 comma)
 - ⑤ Dial Credit Card Number (or PIN number)
- The *KVL 3000* display can store phone numbers with a maximum of 50 digits. However, the display can show a maximum of 10 digits at a time. For longer phone numbers, use the  or  keys to view the next/previous block of 10 digits of the phone number. (In *Edit* mode, you may move the cursor immediately to the end of the phone number by pressing the  key while the cursor is flashing on the first digit of the phone number. You may use the  or  keys to move the cursor one character at a time.)




◆ End of This Procedure ◆

Setting Up KVL 3000 for KMF Operation (continued)

Entering the KMFRSI — The KMF requires a Radio Set Identifier (RSI) in order to operate in the OTAR system. The KVL 3000 will only accept keys and KMMs from the KMF with this RSI. Enter the RSI as follows.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:




2. Use the  or  keys to navigate to KMFRSI, then press  to select **KMFRSI**. The following screen will display.



— continued on next page —

Setting Up KVL 3000 for KMF Operation (continued)

3. Press the  key to select **EDIT**. A warning screen will appear notifying you that editing the KMFRSI will destroy any *Store and Forward* messages and target status updates that may be stored in the *KVL 3000*. Select **Abort** to exit *Edit* mode, or select **OK** to enter/edit the KMFRSI number. The following screen will appear.



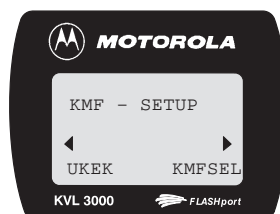
4. Enter the desired KMFRSI number (7 digits maximum; entry of leading zeroes not required) and then press the **Enter** key to accept the entry.




◆ End of This Procedure ◆

Setting Up KVL 3000 for KMF Operation (continued)

Entering the MNP — The Message Number Period (MNP) is used in an ASTRO 25 system feature that provides additional security in the over-the-air rekeying of subscriber units. The MNP number may range from 0 thru 65535, and serves as an offset value used in synchronizing OTAR rekeying transmissions. Enter the desired MNP as follows.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:




2. Use the  or  keys to navigate to **MNP**, then press  to select **MNP**. The following (typical) screen will display.



— continued on next page —

Setting Up KVL 3000 for KMF Operation (continued)

Note *Entering an MNP value of 0 or 65535 disables Message Number checking and weakens your system's security. Consult with your Security Officer to obtain the recommended value.*

3. Press the  key to select **EDIT**. The following screen will appear.



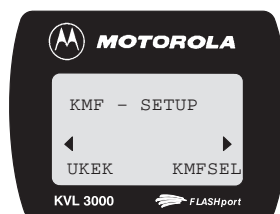
4. Enter the desired MNP number (0 thru 65535; entry of leading zeroes not required) and then press the **Enter** key to accept the entry. A larger number provides less rekeying security, a smaller number provides more rekeying security.




◆ End of This Procedure ◆

Setting Up KVL 3000 for KMF Operation (continued)

Entering the KVLRSI — The KVL 3000 requires a Radio Set Identifier (RSI) in order to operate in the OTAR system. Enter the RSI as follows.

1. Navigate to the **KMF** menu, then navigate to and select **SETUP**. The following screen will appear:




2. Use the  or  keys to navigate to KVLRSI, then press  to select KVLRSI. The following screen will display.



Important! The KVLRSI must match the individual RSI assigned to this KVL in the KMF.

— continued on next page —

Setting Up KVL 3000 for KMF Operation (continued)

3. Press the  key to select **EDIT**. The following screen will appear.



4. Enter the desired KVLRSI number (7 digits maximum; entry of leading zeroes not required) and then press the **Enter** key to accept the entry.

◆ End of This Procedure ◆


Loading Keys from KVL 3000 to KMF

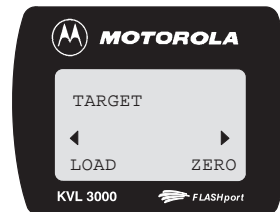
In this procedure, encryption keys that have been entered and stored in the *KVL 3000* are transferred to the KMF one at a time. This scenario requires that the *KVL 3000* be connected directly to the KMF via a key load cable.


1. Request that the KMF operator set up the KMF to receive a key load from a KVL.
2. Connect the *KVL 3000* to the key load port on the KMF's EMC module using a standard key load cable (TKN8531).

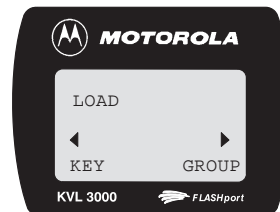
— continued on next page —


Loading Keys from KVL 3000 to KMF (continued)

3. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:



4. Use the  key to select **LOAD**. The following screen will appear:



5. Use the  key to select **KEY**. The following (typical) screen will appear:



— continued on next page —

Loading Keys from KVL 3000 to KMF (continued)

6. Use the ◀ or ▶ keys to select the key you wish to load to the KMF (or use the keypad to directly enter the location number, then press **Enter**).
7. Use the ⏏ key to select **LOAD**. The following screen will appear while the key is being loaded.



8. When finished, the following screen will appear to confirm that the key was loaded to the KMF. Use the ⏏ key to select **OK**.



Important *If the key-load fails, make sure that the KMF is setup to accept the algorithm type of the key being transferred from the KVL 3000.*

◆ End of This Procedure ◆

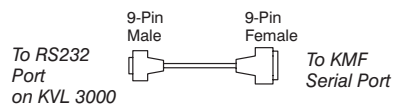
Loading Keys from KMF to the KVL 3000 using Direct Connection

In this procedure, encryption keys stored in the KMF are downloaded to the *KVL 3000* via a direct cable connection.

Note *The KVL 3000 must have a UKEK assigned for the algorithm type of the keys being downloaded, and the UKEK must match the UKEK defined for this KVL 3000 in the KMF.*

1. Request that the KMF operator set up the KMF to download keys to a *KVL 3000*. Note that these may be individual keys intended to be stored in the *KVL 3000* key database, *Store and Forward* keys (see page 7–30 for details) or a combination of both.
2. Connect a null modem cable between the *KVL 3000* RS-232 port and a COM port on the KMF Server (typically COM1).


Note *The baud rate set in the KVL 3000 must match the baud rate set in the KMF.*

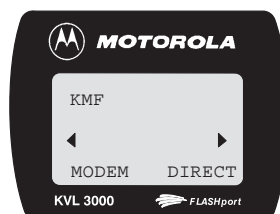



Null Modem Cable

— continued on next page —


Loading Keys from KMF to the KVL 3000 using Direct Connection (continued)

3. Use the  key to select **KMF** from the *Main Menu*. The following screen will appear:



4. Use the  key to select **DIRECT**. The following screen will appear:




5. Use the  key to select **RS232**. The following screen will appear:



Note To abort the downloading operation, press the **Esc** key.

— continued on next page —

Loading Keys from KMF to the KVL 3000 using Direct Connection (continued)

6. The KVL 3000 will communicate with the KMF to begin the download process. Messages will appear in the display to indicate the progress of the download process.
7. When the keys have been successfully downloaded, the following screen will appear. Use the  key to select **OK**.



◆ End of This Procedure ◆

Loading Keys from KMF to the KVL 3000 using Modem Connection

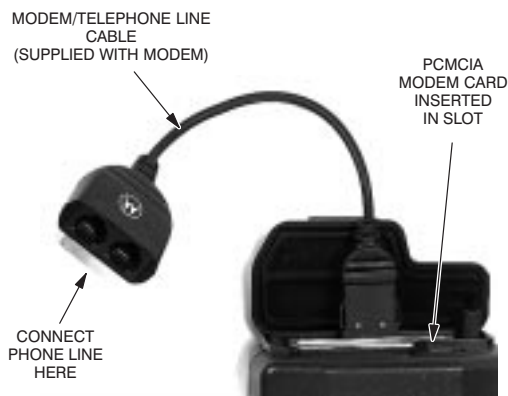
Note The KVL 3000 supports most single function PCMCIA modem cards. Multi-function cards (e.g., Modem/LAN cards) may have unique software requirements, and therefore may not work with the KVL 3000.

PCMCIA Modem Card Procedure

In this procedure, encryption keys stored in the KMF are downloaded to the KVL 3000 via a PCMCIA modem card.


Note The KVL 3000 must have a UKEK assigned for the algorithm type of the keys being downloaded, and the UKEK must match the UKEK defined for this KVL 3000 in the KMF.

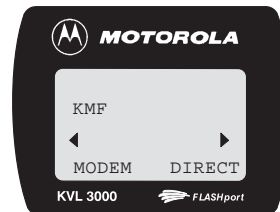
1. Request that the KMF operator set up the KMF to download keys to a KVL 3000.
2. Insert the PCMCIA modem into the KVL 3000 and connect the cable to the phone line as shown below.




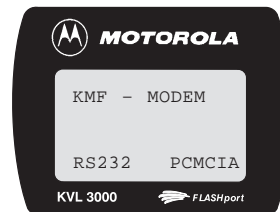
— continued on next page —


Loading Keys from KMF to the KVL 3000 using Modem Connection (continued)

3. Use the  key to select **KMF** from the *Main Menu*. The following screen will appear:



4. Use the  key to select **MODEM**. The following screen will appear:



5. Use the  key to select **PCMCIA**. The following screen will appear:



Note The display will show the phone number you entered (see page 7–9) for the KMF currently selected as active (see page 7–7). If you did not enter a phone number, or you wish to change the number, select **EDIT** and enter/modify the phone number.

— continued on next page —

Loading Keys from KMF to the KVL 3000 using Modem Connection (continued)

Note To abort the downloading operation, press the **Esc** key.

6. Use the ☐ key to select **DIAL**. The following screen will appear:



7. The KVL 3000 will dial and connect with the KMF via the modem connection. Once connected, the keys will be downloaded. This process can take several minutes.
8. When the keys have been successfully downloaded, the KVL 3000 will terminate the connection, and the following screen will appear. Use the ☐ key to select **OK**.



◆ End of This Procedure ◆

Loading Keys from KMF to the KVL 3000 using Modem Connection (continued)

Note The baud rate set in the KVL 3000 must match the baud rate set in the KMF.

External Modem Procedure

In this procedure, encryption keys stored in the KMF are downloaded to the KVL 3000 via an RS232 cable connection to an external modem.


Note The KVL 3000 must have a UKEK assigned for the algorithm type of the keys being downloaded, and the UKEK must match the UKEK defined for this KVL 3000 in the KMF.

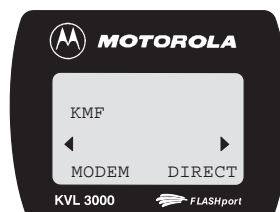
1. Request that the KMF operator set up the KMF to download keys to a KVL.
2. Connect a CKN6324 cable from the KVL 3000's RS232 port to the external modem, as shown below.




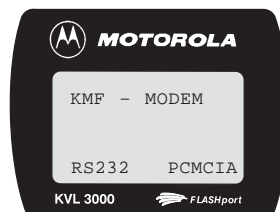
— continued on next page —


Loading Keys from KMF to the KVL 3000 using Modem Connection (continued)

3. Use the  key to select **KMF** from the *Main Menu*. The following screen will appear:



4. Use the  key to select **MODEM**. The following screen will appear:



5. Use the  key to select **RS232**. The following screen will appear:



Note The display will show the phone number you entered (see page 7–9) for the KMF currently selected as active (see page 7–7). If you did not enter a phone number, or you wish to change the number, select **EDIT** and enter/modify the phone number.

— continued on next page —

Loading Keys from KMF to the KVL 3000 using Modem Connection (continued)

6. Use the ☐ key to select **DIAL**. The following screen will appear:



7. The KVL 3000 will dial and connect with the KMF via the modem connection. Once connected, the keys will be downloaded. This process can take several minutes.
8. When the keys have been successfully downloaded, the KVL 3000 will terminate the connection, and the following screen will appear. Use the ☐ key to select **OK**.



◆ End of This Procedure ◆

Using the Store and Forward Feature

Introduction

The *Store and Forward* feature (supported only in *ASTRO 25* operation) offers a simplified and more secure method of transferring keys and other messages from a KMF to target devices (via the *KVL 3000*).

Once a *Store and Forward* download from the KMF to the *KVL 3000* has occurred, the *KVL 3000* operator can simply connect the *KVL 3000* to a target device and select *Update*. The *KVL 3000* will automatically identify the target device (by its RSI), determine if there are any keys intended for this target, and download the keys. The *KVL 3000* operator need not have any knowledge of the number of keys, the CKR or KID values, or the algorithm types.


Note *The UKEK must be present in the KVL 3000 and target devices in order to support Store and Forward operation.*

— continued on next page —

Using the Store and Forward Feature (continued)

Updating a Target Device

In this procedure, it is assumed that the KMF has downloaded *Store and Forward* messages to the *KVL 3000*. These messages include keys and identify the target devices for which the keys are intended. You will now connect the *KVL 3000* to one of the target devices and select *Update* from the *Main Menu*. The *KVL 3000* will verify that the target device has keys intended for it and then download the keys. If no keys are intended for this target device, the *KVL 3000* will display a message indicating such. *(You may also view the Store and Forward items by using the List selection and manually select the desired target device to update. Refer to page 7–33 for details on viewing the Store and Forward list.)*

1. Turn on the *KVL 3000* and the target radio, then connect them using the appropriate cable.
2. Use the  key to select **UPDATE** from the *Main Menu*. The following screen will appear:



— continued on next page —

Using the Store and Forward Feature (continued)

3. If the target device has *Store and Forward* keys stored in the *KVL 3000*, the following screen will appear. Otherwise, a message will indicate that "There is no update for this unit."



4. When the update has completed, the following screen will appear. Use the ☐ key to select **OK**. (Selecting **MORE** will display a message reminding you to connect to the KMF to upload the target unit responses. This is required to keep the KMF in sync with the target devices.)




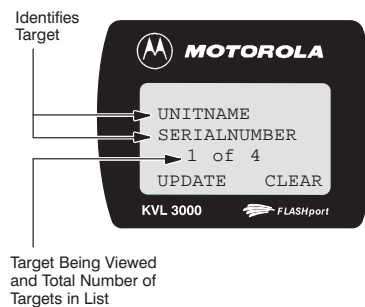
◆ End of This Procedure ◆



Using the Store and Forward Feature (continued)

Viewing the Store and Forward List

In this procedure, it is assumed that the KMF has downloaded *Store and Forward* messages to the *KVL 3000*. The target units for which there are messages may be viewed by selecting *List* from the *Main Menu*. You may then scroll through the list and view the targets (by Unit Name and Serial Number, as assigned in the KMF) for which there are messages. While viewing the list, you may also *Update* a particular target unit and (supervisors only) clear the entire *Store and Forward* list.

1. Use the  key to select **LIST** from the *Main Menu*. If *Store and Forward* messages are currently contained in the *KVL 3000*, the following (typical) screen will appear:





2. Use the  or  keys to scroll forward and backward through the list as desired.

— continued on next page —

Using the Store and Forward Feature (continued)

Note Once a successful update has been performed on a target device, it cannot be updated again until the KVL 3000 has been connected to the KMF to upload the unit response messages.

While Viewing the Store and Forward List ...

- You may *Update* a specific target unit by connecting the KVL 3000 to the target unit, scrolling to the unit's *Store and Forward* entry, and pressing the  key to select **UPDATE**. The *Update* process will occur as described on page 7–31.
- You may use the  key to select **CLEAR** to erase all current *Store and Forward* messages. A confirmation screen will appear. Select **YES** to erase the messages.

Important! *Clearing the messages also erases all unit responses. Do not clear the messages until you have reconnected with the KMF and uploaded the unit responses.*

- A check mark (✓) next to the entry (as shown below) indicates that the *Store and Forward* messages have already been loaded into the specific target device.



◆ End of This Procedure ◆

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Viewing/Loading OTAR Configuration Parameters

Introduction

The following parameters are required by target devices in order to operate within an OTAR system:

- TGTRSI
- KMFRSI
- MNP

In most cases, these parameters are loaded into the target devices automatically by the *KVL 3000* during the initial Store and Forward update, via the KMF. The *KVL 3000* has the capability of viewing these parameters, as well as loading new parameters into target devices (should this be necessary). Each of these tasks is described on the following pages.


— continued on next page —

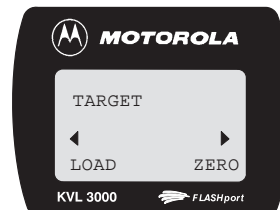
Viewing/Loading OTAR Configuration Parameters (continued)

Note These parameters are viewable only when KMF is enabled (via Config menu).

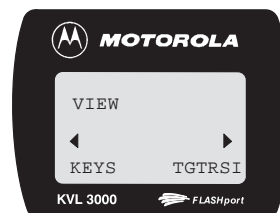
Viewing a Target's TGTRSI, KMFRSI, and MNP

In this procedure, you will connect the KVL 3000 to a target device (radio, DIU, RMC, etc.) and view the TGTRSI, KMFRSI, and MNP currently stored in the device.

1. Turn on the KVL 3000 and the target device, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the Main Menu. The following screen will appear:



3. Use the  or  keys to navigate to VIEW, then press  to select **VIEW**. The following screen will appear:



— continued on next page —

Viewing/Loading OTAR Configuration Parameters (continued)

4. Use the ◀ or ▶ keys to navigate to TGTRSI, KMFRSI, or MNP (as desired), then press ⏏ to select the desired parameter. The KVL 3000 will query the target and retrieve the selected parameter. The following screen will appear (TGTRSI shown):




Note When viewing TGTRSI, the Individual RSI is displayed first. Use the ◀ or ▶ keys to display the Group RSI.

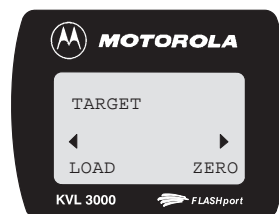
◆ End of This Procedure ◆


Viewing/Loading OTAR Configuration Parameters (continued)

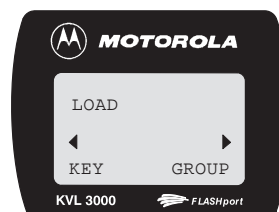
Loading a TGTRSI, KMFRSI, or MNP into Target Device

In this procedure, you will connect the *KVL 3000* to a target device (radio, DIU, RMC, etc.) and load a TGTRSI, KMFRSI, or MNP into the device.

1. Turn on the *KVL 3000* and the target device, then connect them using the appropriate cable.
2. Use the  key to select **TARGET** from the *Main Menu*. The following screen will appear:



3. Press  to select **LOAD**. The following screen will appear:



— continued on next page —

Viewing/Loading OTAR Configuration Parameters (continued)

4. Use the ◀ or ▶ keys to navigate to TGTRSI, KMFRSI, or MNP (as desired), then press ⏏ to select the desired parameter. The following screen will appear (TGTRSI shown):



5. Enter the desired TGTRSI (or KMFRSI or MNP), then press ⏏ to select **LOAD**. The KVL 3000 will load the entered parameter into the target device. Messages will appear in the display to indicate the status of the process.

Note If you select TGTRSI, the LOAD selection will not appear until you have entered the first digit of the RSI.

If you select KMFRSI or MNP, the KMFRSI or MNP currently stored in the KVL 3000 (using SETUP as described in **Setting Up KVL 3000 for KMF Operation** in this chapter) will be displayed. You may edit this number as desired.

◆ End of This Procedure ◆

Chapter 8 Viewing and Printing Log Records

chapter contents

About Log Records	2
Viewing Log Records on KVL 3000 Display	3
Clearing Log Records	4
Transferring Log Records to a PC	5
Printing Log Records to a Serial Printer	7
Log Record Format	8

About Log Records

Introduction

The *KVL 3000* maintains a running record of the most recent 128 successful target operations. Each record is timestamped and contains detailed information about the particular operation (Load or Zero), the key's CKR, and the target's RSI.

Access to the log records may be gained in three ways:

- Viewed and scrolled on the *KVL 3000* display
- Transferred to a PC for printing or saving to a file
- Printed directly from the *KVL 3000* to a serial printer

The log records may also be cleared (erased) from the *KVL 3000* (supervisor only).

How the Log Records are Organized

The log records are stored chronologically in a 128-location continuous buffer, with the most recent log record displayed first each time you access the log records.

Each new log record created is appended to the beginning of the buffer, with each existing log record moving down one position.

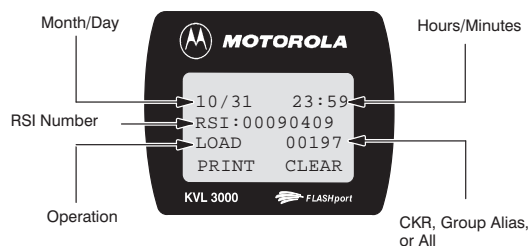
When the buffer is full (128 entries maximum), the next new log record is appended to the beginning, the existing log records move down one position, and the oldest log record is overwritten.

View Log Records on KVL 3000 Display

Note In this sample screen, the KVL 3000 loaded the key identified as 00197 (CKR) into target device 00090409 (RSI) at 23:59 on 10/31.

Accessing the Log Records

Navigate to and select **Log** in the *Main Menu*. The following screen will appear (typical screen shown; see sidebar for details on interpreting this screen). This is the most recent log record.



- **Month/Day** — date operation occurred
- **Hours/Minutes** — time operation occurred (24-hour format)
- **RSI Number** — Radio Set Identifier; number assigned to each radio for identification purposes
- **Operation** — Displays either “LOAD” or “ZERO” to indicate operation performed
- **CKR, Group Alias or All** — Displays the CKR (Common Key Reference), the Group Alias (name assigned to the key group), or All (all the keys in the KVL 3000)

Scrolling Through the Log Records

With the first log record showing in the KVL 3000 display, press the ◀ or ▶ keys to scroll forward or backward through the 128 most recent records. Press the ▶ key to scroll backwards chronologically (i.e., most recent, next most recent, etc.). Press the ◀ key to scroll to the oldest record, then next oldest, etc.

Clearing Log Records

With any of the log records showing on the KVL 3000 display, perform the following to clear the log. (You must be a supervisor to clear the log.)

1. Press ☐ to select **CLEAR**. The following screen will appear:



2. Press ☐ to select **YES**. The following screen will appear to confirm that the log has been cleared.



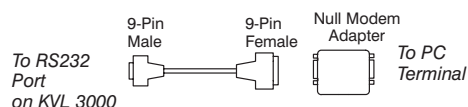
◆ End of This Procedure ◆

Transferring Log Records to a PC

The KVL 3000 may be connected to a COM port on a PC (typically a laptop) and transfer the log records to the PC. The records may then be printed from the PC or saved on the PC as a file.

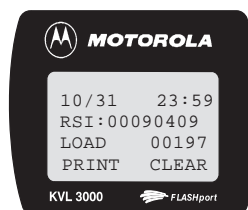
Important! A communications program (such as PROCOMM™) must be running on the PC in order to transfer log records.

1. Connect a cable between the KVL 3000 RS-232 port and a COM port on the PC (typically COM1).




Note Be sure to set up the baud rate in the KVL 3000 to match the baud rate in the communications program.

2. Launch a communications program on the PC (such as PROCOMM™ or equivalent). Set up the program as follows:
 - No parity
 - 8 bits
 - 1 stop bit
 - Translate line feeds <LF> to Carriage Return and Line Feed <CR> <LF>
 - 80 character width
3. Navigate to and select **Log** in the *Main Menu*. The following screen will appear:



— continued on next page —

Transferring Log Records to a PC (continued)

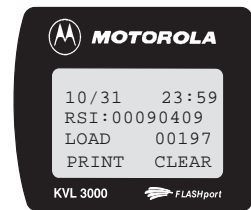
4. Press  to select **PRINT**. The log records will be transferred to the open communications window on the PC.
5. When finished, you may either print the log records to a printer connected to the PC, or save the log records as a file on the PC.

◆ **End of This Procedure** ◆

Printing Log Records to a Serial Printer

The log records may be printed directly to a serial printer connected to the *KVL 3000*.

1. Connect an appropriate cable between the *KVL 3000* RS-232 port and a serial printer.
2. Navigate to and select **Log** in the *Main Menu*. The following screen will appear:



3. Press to select **PRINT**. The log records will be printed to the serial printer.

◆ End of This Procedure ◆

Log Record Format

When printing to a serial printer or to a PC, the log records are formatted as shown below:

Typical Log Record

DATE	TIME	TARGET RSI	OPERATION	CKR	GROUP ALIAS
10/19/99	21:45	00689121	load key	00252	N/A
10/19/99	20:10	00006783	load all	N/A	N/A
10/1/99	09:39	04984321	load group	N/A	ALPHA 1
09/16/99	14:59	04984322	zero key	61440	N/A
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
•	•	•	•	•	•
06/28/99	08:31	00990346	zero group	N/A	UNIT 1

chapter contents

Interpreting Error Messages **2**

Performing Resets **11**

Interpreting Error Messages

Introduction

Two types of error messages are provided by the *KVL 3000* in *ASTRO 25* mode:

- **User Entry Errors** — Displayed when operator performs an illegal or disallowed action (such as entering an invalid value, entering a duplicate KID, etc.).
- **Operational Error Messages** — Displayed during normal operation in response to an operator-initiated function (e.g., attempting to load a key to a target device).

User Entry Errors

The table on the facing page shows all possible *User Entry Errors* presented in alphabetical order, along with probable causes and remedies.

User Entry Errors

Error/Status Message	Probable Cause and Remedy
CANNOT ENTER SAME KID FOR THIS ALGO!!	<p>Probable Cause(s): 1) You have attempted to enter a key into the <i>KVL 3000</i> with a KID that is already assigned to an existing key of the same algorithm type.</p> <p>Remedy(s): 1) Select a unique KID for the new key being entered.</p>
CANNOT PORT! KID EXISTS FOR ALGO IN ASN!	<p>Probable Cause(s): 1) You have attempted to port an <i>ASTRO 25</i> key to ASN and a TEK of the same algo type and KID already exists in ASN.</p> <p>Remedy(s): 1) Delete the ASN key that has the same KID.</p>
INVALID KEY ENTERED!!!	<p>Probable Cause(s): 1) You have entered a key that is considered to be invalid after <i>KVL 3000</i> performs internal encryption tests on key.</p> <p>Remedy(s): 1) Enter a different key.</p>
INVALID PID! CHECK ASN SPLIT VALUE!	<p>Probable Cause(s): 1) You have attempted to port an <i>ASTRO 25</i> key to an invalid PID location in ASN (e.g., a TEK key must be ported to the ASN memory partition assigned to Traffic Keys).</p> <p>Remedy(s): 1) Verify the split value (assigned via CONFIG menu in ASN operation) that divides the memory between Traffic and Shadow keys. TEKs must be ported to Traffic Key PIDs, KEKs must be ported to Shadow Key PIDs).</p>
WRONG PARITY ENTERED!	<p>Probable Cause(s): 1) DES key entered into <i>KVL 3000</i> has incorrect parity (odd parity is required per byte for DES keys).</p> <p>Remedy(s): 1) Make sure key to be entered is correct and has odd parity, then re-enter the key</p>

Interpreting Error Messages (continued)

Operational Error Messages

The table on the next page shows all *Operational Errors* presented in alphabetical order, along with probable causes and remedies.

Operational Error Messages

Operational Error Message	Probable Cause and Remedy
ALGO IS NOT SUPPORTED IN TARGET!	<p>Probable Cause(s): 1) You have attempted to load a key with an algorithm type that is not supported by the target. 2) You have attempted to load a Key Group and one or more of the keys in the group has an algorithm type not supported by the target. 3) You have attempted to load ALL Keys and one or more of the keys has an algorithm type not supported by the target.</p> <p>Remedy(s): 1, 2, and 3) You cannot load keys with algorithm types not supported by target.</p>
BAD RESPONSE FROM THE KMF! XXXX	<p>Probable Cause(s): 1) KMF is not set up correctly.</p> <p>Remedy(s): 1) Request that KMF operator verify that KMF is set up correctly. If so, report the 4-digit code at the end of the error message (xxxx) to Motorola Service Center.</p>
CONNECTED TARGET DOES NOT MATCH THE ONE YOU SELECTED!	<p>Probable Cause(s): 1) You have attempted to perform a <i>Store and Forward</i> keyload on a target but have selected the wrong target in LIST menu.</p> <p>Remedy(s): 1) Select the correct target in LIST menu.</p>
INVALID RESPONSE FROM TARGET!	<p>Probable Cause(s): 1) Target is not <i>ASTRO 25</i> compatible or not in <i>ASTRO 25</i> mode.</p> <p>Remedy(s): 1) Verify that target is <i>ASTRO 25</i> compatible and in <i>ASTRO 25</i> mode.</p>

Operational Error Message	Probable Cause and Remedy
KEY DATABASE IS CORRUPTED FIX?	<p>Probable Cause(s): 1) An error occurred that caused the KVL internal key database to become corrupted.</p> <p>Remedy(s): 1) Respond to the "FIX?" KVL prompt by selecting YES to fix the database. This will cause all keys, Key Groups, and <i>Store and Forward</i> messages to be erased. Important! If you experience frequent database corruptions, power the KVL down (do not fix database) and contact the Motorola Service Center.</p>
KVL IS OUT OF MEMORY!!	<p>Probable Cause(s): 1) You have exceeded the <i>KVL 3000</i>'s memory capacity (i.e., the <i>KVL 3000</i> memory is full of keys and/or <i>Store and Forward</i> messages). 2) A hardware failure has occurred in the <i>KVL 3000</i> memory circuitry.</p> <p>Remedy(s): 1) Delete obsolete keys and/or Key Groups, or Connect with KMF and perform upload to transfer all unit responses (which in turn removes the corresponding <i>Store and Forward</i> messages from <i>KVL 3000</i> memory). 2) Contact Motorola Service Center</p>
KVL'S KMFRSI DOES NOT MATCH ACTUAL	<p>Probable Cause(s): 1) The KMFRSI (stored in the KVL) does not match the RSI assigned in the KMF for this KVL.</p> <p>Remedy(s): 1) Coordinate with KMF operator to ensure that the RSIs match.</p>
OPERATION IS NOT ALLOWED BY TARGET!	<p>Probable Cause(s): 1) An operation incompatible with the target was attempted. See Table 1 on page 9–10 for allowed operations.</p> <p>Remedy(s): 1) You cannot perform disallowed operations.</p>

Operational Error Message	Probable Cause and Remedy
SHARING WITH THE KVL IS NOT ALLOWED!	Probable Cause(s): 1) Sharing is turned off in source KVL. Remedy(s): 1) Enable sharing (ON) via CONFIG menu in source KVL.
TARGET IS NOT RESPONDING!!	Probable Cause(s): 1) Target is not connected or connection is not secured properly. 2) Target is not powered on. 3) Target is not <i>ASTRO 25</i> compatible or not in <i>ASTRO 25</i> mode. 4) Target may not be properly set up (via RSS) to support keyloading. 5) Target hardware is defective. 6) If sharing with another KVL, sharing is not enabled (via CONFIG menu) in the target KVL or target KVL is not in <i>ASTRO 25</i> mode. Remedy(s): 1) Verify that the keyload cable is good and properly connected to both the KVL and the target. 2) Turn target power on. 3) Verify that target is <i>ASTRO 25</i> compatible and in <i>ASTRO 25</i> mode. 4) Make sure target is properly configured (via RSS) to support keyloading. 5) Contact Motorola Service Center 6) Enable sharing (ON) in <i>ASTRO 25</i> mode via CONFIG menu in target KVL.
TARGET IS OUT OF MEMORY!!	Probable Cause(s): 1) Target has reached memory capacity. 2) Target is a single key device and already contains a key. 3) Failure in target memory circuitry Remedy(s): 1) Delete (zeroize) obsolete keys in target. 2) Single key devices can contain only one key. 3) Contact Motorola Service Center

Operational Error Message	Probable Cause and Remedy
TARGET'S SYSKEY DOES NOT MATCH!	<p>Probable Cause(s): 1) When sharing and performing a Load Key or Load Group operation with a DVI-XL key, the System Key in the source KVL must match the System Key in the target KVL.</p> <p>Remedy(s): 1) Ensure that the System Keys in both KVLs match.</p>
TARGET UPDATE FAILURE!	<p>Probable Cause(s): 1) One or more <i>Store and Forward</i> commands were not performed correctly.</p> <p>Remedy(s): 1) Connect the KVL to the KMF to upload the unit responses and download any new <i>Store and Forward</i> messages.</p>
TEK NEEDED FOR KMF DOWNLOAD!	<p>Probable Cause(s): 1) In order to perform a download, the KVL must contain a UKEK as assigned in the KMF. In this case, a TEK has not been assigned or it does not match the TEK in the KMF.</p> <p>Remedy(s): 1) Coordinate with the KMF operator to ensure that TEKs are assigned and match.</p>
TIMED OUT! NO RESPONSE FROM KMF!	<p>Probable Cause(s): 1) Baud rates do not match between KVL and KMF. 2) KMF is not set up correctly for <i>Store and Forward</i> operation.</p> <p>Remedy(s): 1) Make sure that baud rate in KVL (via CONFIG menu) matches the baud rate in the KMF. 2) Request that KMF operator verify that KMF is set up correctly for <i>Store and Forward</i> operation.</p>
UKEK NEEDED FOR KMF DOWNLOAD!	<p>Probable Cause(s): 1) In order to perform a download, the KVL must contain a UKEK as assigned in the KMF. In this case, a UKEK has not been assigned or it does not match the UKEK for this KVL 3000 in the KMF.</p> <p>Remedy(s): 1) Coordinate with the KMF operator to ensure that UKEKs are assigned and match.</p>

Operational Error Message	Probable Cause and Remedy
UNIT HAS BEEN UPDATED ALREADY!	<p>Probable Cause(s): 1) You have attempted to repeat a <i>Store and Forward</i> keyload to a target (a ✓ appears next to the entry in the List view to indicate that the <i>Update</i> operation has already been performed successfully).</p> <p>Remedy(s): 1) Connect the KVL to the KMF to upload the unit responses and download any new <i>Store and Forward</i> messages.</p>
UNKNOWN ERR! CHECK TARGET ALGORITHM!	<p>Probable Cause(s): 1) You have attempted to load a key into a target that does not support the key's algorithm type. 2) Target may not be properly set up (via RSS) to support keyloading.</p> <p>Remedy(s): 1) Make sure target can support algorithm type of key being loaded. 2) Make sure target is properly configured (via RSS) to support keyloading.</p>

Table 1 *List of Allowed Operations*

Targets Operation	Portable/ Mobile Radio	DIU- EMC	RNC- EMC	KVL	KMF- EMC
LOAD KEY	Yes	Yes	Yes	Yes	Yes
LOAD GROUP	Yes	Yes	Yes	Yes	No
LOAD ALL	Yes	Yes	Yes	Yes	No
LOAD TGTRSI	Yes	Yes	Yes	No	No
LOAD KMFRSI	Yes	Yes	Yes	No	No
LOAD MNP	Yes	Yes	Yes	No	No
ZERO ALL	Yes	Yes	Yes	No	No
ZERO GROUP	Yes	Yes	Yes	No	No
ZERO KEY	Yes	Yes	Yes	No	No
VIEW KEYS	Yes	Yes	Yes	No	No
VIEW TGTRSI	Yes	Yes	Yes	No	No
VIEW KMFRSI	Yes	Yes	Yes	No	No
VIEW MNP	Yes	Yes	Yes	No	No
UPDATE	Yes	Yes	Yes	No	No

Performing Resets

Note For KVL 3000s equipped for dual mode operation (ASN and ASTRO 25), note that re-setting also erases ASN keys, USK, and Group Maps.

Introduction

Resetting causes the KVL 3000 to return to factory settings (i.e., erases the UKEKs, all stored keys, passwords, and resets the configuration settings to the factory defaults).

Performing a Reset

1. Press and hold **Del/Shift**, then press the **Enter** key. The following screen will appear:



2. Use the ☐ key to select **YES**. The following confirmation screen appears.



3. Use the ☐ key to select **OK**. A reset process takes from a few seconds to about a minute.

◆ End of This Procedure ◆

Notes ...

Chapter 1 Using the Key Porting Feature

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Overview of Key Porting Feature

Introduction

The *KVL 3000* (when equipped with both X795 and U239 options) is capable of storing keys in both ASN and *ASTRO 25* formats. The “key porting” feature allows you to copy an ASN traffic or shadow key from its ASN memory location (stored to a PID and containing a LID) and load it into an empty *ASTRO 25* TEK or KEK memory location (stored to a CKR and containing a KID) (and vice versa).

Example of Key Porting

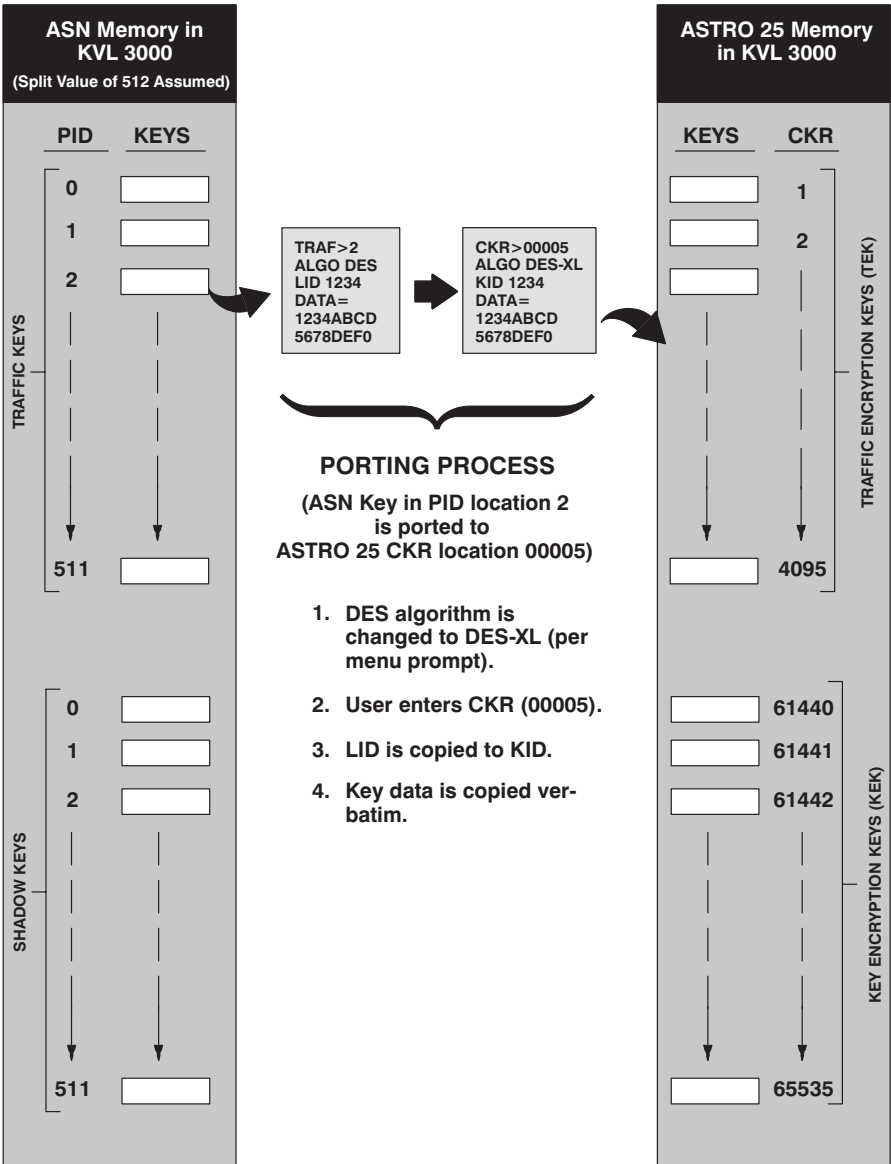
The illustration on the facing page shows a typical example of porting an ASN key to an *ASTRO 25* memory location.

When To Use The Key Porting Feature

The two most common scenarios for using the key porting feature are:

- **Copying keys between ASN and *ASTRO 25* in the KVL memory** — There may be occasions when you have an existing key in an ASN memory location and wish to duplicate it for use on an *ASTRO 25* target. By “porting” the key from ASN memory to *ASTRO 25* memory within the *KVL 3000*, you save the effort of recreating the key in the *ASTRO 25* memory and re-entering the encryption key data. (You may also port keys from *ASTRO 25* memory and load them into ASN memory.)
- **Copying keys between a KMC and a KMF** — You can use the *KVL 3000* as a “transfer device” to copy keys from a KMC (in ASN format) and load them into a KMF (in *ASTRO 25* format). (You may also copy keys from a KMF and load them into a KMC.)

Example of Porting a Key from ASN to ASTRO 25



Overview of Key Porting Feature (continued)

Key Porting Restrictions and Guidelines

Please observe the following restrictions and guidelines when porting keys:

- Only keys with DES (XL or OFB), DVP-XL, and DVI-XL algorithms can be ported
- TEKs of the same algorithm type stored in *ASTRO 25* memory can not have duplicate KIDS (including 0000)
- Keys of the same algorithm type stored in ASN memory can not have duplicate KIDS (except 0000 is allowed)
- Traffic Keys (ASN) can be ported only to Traffic Encryption Keys (TEK) locations in *ASTRO 25* memory (and vice versa); Shadow Keys (ASN) can be ported only to Key Encryption Keys (KEK) locations in *ASTRO 25* memory (and vice versa)
- Keys can be ported only to an empty memory location; overwriting is not allowed
- Keys must be ported one at a time.


Porting Keys within the KVL 3000

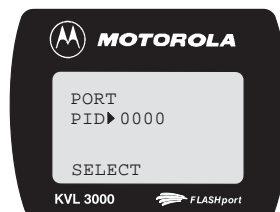
Porting a Key from ASN to ASTRO 25

The following example describes how to port an existing traffic key from ASN memory to ASTRO 25 memory within the KVL 3000.

1. Make sure the KVL 3000 is in ASN operating mode (described in *Switching Between ASN and ASTRO 25 Operation* behind the **MIGRATION** tab).
2. Navigate to and select **PORT** in the *Main Menu*. The following screen will appear:






3. Use the  key to select **TRAF** (or **SHAD**). The following screen will appear.

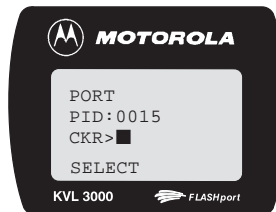


— continued on next page —

Porting Keys within the KVL 3000 (continued)

Note Since in this example the key selected for porting uses the DES algorithm, you will be prompted in the next step to select either DES-XL or DES-OFB. Had the selected key's algorithm been DVI-XL or DVP-XL, the key would be ported using the same algorithm and you would not be prompted to select an algorithm.

4. Use the  or  keys to select the traffic key you wish to port (or use the keypad to directly enter the location number). (In this example, **15** has been selected.)
5. Use the  key to select **SELECT**. The following screen will appear:






6. Use the keypad to enter the **CKR** for the **ASTRO 25** memory location into which you wish to port the key. (Remember, traffic keys must be ported to the TEK memory location range of 1–4095; shadow keys must be ported to the KEK memory location range of 61440 – 65535.) When finished, press the **Enter** key. The following screen will appear.




— continued on next page —

Porting Keys within the KVL 3000 (continued)

7. Use the  or  keys to select DES-XL or DES-OFB. (In this example, **DES-XL** has been selected.)
8. Use the  key to select **ACCEPT**. The following screen will appear:



9. Use the  key to select **YES**. The key will be ported, as indicated by a short “chirp” emitted by the KVL 3000. The following screen will appear, awaiting the next PID to be selected for porting (if desired). Press the **Esc** key to exit the menu.



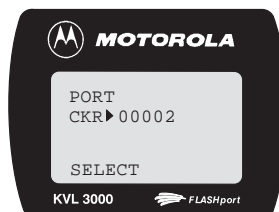
◆ End of This Procedure ◆

Porting Keys within the KVL 3000 (continued)

Porting a Key from *ASTRO 25* to ASN

The following example describes how to port an existing Traffic Encryption Key (TEK) from *ASTRO 25* memory to ASN memory within the *KVL 3000*.


1. Make sure the *KVL 3000* is in *ASTRO 25* operating mode (described in *Switching Between ASN and ASTRO 25 Operation* behind the **MIGRATION** tab).
2. Navigate to and select **PORT** in the *Main Menu*. The following screen will appear:

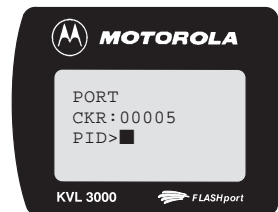


3. Use the ◀ or ▶ keys to select the CKR for the key you wish to port (or use the keypad to directly enter the location number). (In this example, **00005** has been selected.)

— continued on next page —

Porting Keys within the KVL 3000 (continued)

4. Use the  key to select **SELECT**. The following screen will appear:




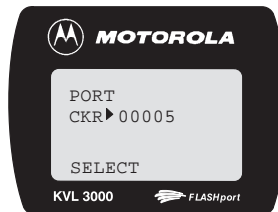
5. Use the keypad to enter the **PID** for the ASN memory location into which you wish to port the key. (Remember, TEK keys must be ported to the traffic key memory locations; KEK keys must be ported to the shadow key memory locations. These locations are determined by the Split Value entered via the CONFIG menu.) When finished, press the **Enter** key. The following screen will appear.



— continued on next page —

Porting Keys within the KVL 3000 (continued)

6. Use the  key to select **YES**. The key will be ported, as indicated by a short “chirp” emitted from the KVL 3000. The following screen will appear, awaiting the next CKR to be selected for porting (if desired). Press the **Esc** key to exit the menu.



◆ End of This Procedure ◆

Copying Keys from a KMC to a KMF

Overview

Copying existing keys from a KMC and loading them into a KMF involves the following three major steps:

- Connect the *KVL 3000* to the KMC and load the desired keys from the KMC into the *KVL 3000* memory
- Port the keys (which are in ASN format) to *ASTRO 25* format within the *KVL 3000* memory
- Connect the *KVL 3000* to the KMF and load the keys into the KMF

1 Load the Keys from KMC into KVL 3000

1. Make sure the *KVL 3000* is in ASN mode (as described in *Switching Between ASN and ASTRO 25 Operation* behind the **MIGRATION** tab), and that KMC mode is enabled (navigate to **KMC** within the **CONFIG** menu and select **ON**).
2. Connect the *KVL 3000* to the KMC using either a direct or modem connection and download the desired keys (as described in **Chapter 6** *Using KVL 3000 in OTAR Systems* behind the **ASN OPERATION** tab).

2 Port the Keys from ASN to ASTRO 25

Since the keys were loaded from a KMC, they are in ASN format (i.e., stored according to PIDs and containing LIDs). Before loading the keys into the KMF, you must first port the keys to *ASTRO 25* format. To do this, perform the procedures beginning on page 1–5 of this chapter.

Copying Keys from a KMC to a KMF (continued)

③ Load the Keys from *KVL 3000* into KMF

1. Make sure the *KVL 3000* is in *ASTRO 25* mode (as described in *Switching Between ASN and ASTRO 25 Operation* behind the **MIGRATION** tab).
2. Connect the *KVL 3000* to the KMF and load the desired keys individually (as described in **Chapter 7** *Using KVL 3000 in OTAR Systems* behind the **ASTRO 25 OPERATION** tab).

Copying Keys from a KMF to a KMC

Overview

Copying existing keys from a KMF and loading them into a KMC involves the following three major steps:

- Connect the *KVL 3000* to the KMF and load the desired keys from the KMF into the *KVL 3000* memory
- Port the keys (which are in *ASTRO 25* format) to ASN format within the *KVL 3000* memory
- Connect the *KVL 3000* to the KMC and load the keys into the KMC

1 Load the Keys from KMF into KVL 3000

1. Make sure the *KVL 3000* is in *ASTRO 25* mode (as described in *Switching Between ASN and ASTRO 25 Operation* behind the **MIGRATION** tab), and that KMF mode is enabled (navigate to **KMF** within the **CONFIG** menu and select **ON**).
2. Connect the *KVL 3000* to the KMF and download the desired keys (as described in **Chapter 6 Using KVL 3000 in OTAR Systems** behind the **ASTRO 25 OPERATION** tab).

2 Port the Keys from ASTRO 25 to ASN

Since the keys were loaded from a KMF, they are in *ASTRO 25* format (i.e., stored according to CKRs and containing KIDs). Before loading the keys into the KMC, you must first port the keys to ASN format. To do this, perform the procedures beginning on page 1–8 of this chapter.

Copying Keys from a KMF to a KMC (continued)

- ③ **Load the Keys from KVL 3000 into KMC**
1. Make sure the *KVL 3000* is in ASN mode (as described in *Switching Between ASN and ASTRO 25 Operation* behind the **MIGRATION** tab).
 2. Connect the *KVL 3000* to the KMC using either a direct or modem connection and load the desired keys individually (as described in **Chapter 7** *Using KVL 3000 in OTAR Systems* behind the **ASN OPERATION** tab).

chapter contents

Switching Between ASN and ASTRO 25 Operation **2**

Switching Between ASN and ASTRO 25 Operation

Note The KVL 3000 is shipped from the factory to power up in ASTRO 25 mode. You may switch to ASN mode as described at right. The mode in which your KVL 3000 is operating when powering off determines the mode in which it will operate when applying power. For example, if in ASTRO 25 mode when powering off, the KVL 3000 will power up in ASTRO 25 mode when turning the unit back on.

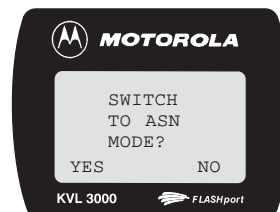
The KVL 3000 provides two modes of operation: **ASN** (Advanced SecureNet) and **ASTRO 25**. Using the menu, you may switch between modes of operation, as follows.


1. Navigate to the **CONFIG** menu, then navigate to and select **MODE**. The display message will briefly indicate the current mode, followed by one of the two screens:

If in ASN Mode...



If in ASTRO 25 Mode...



2. Use the  key to select the desired mode. The KVL 3000 will go through the power up sequence and display the *Main Menu* for the selected mode.

Appendix A Acronyms and Abbreviations

Appendix A Acronyms and Abbreviations

A

ASN Advanced Securenet

C

CIU Console Interface Unit

CKEK Common Key Encryption Key

CSK Common Shadow Key

D

DES Digital Encryption Standard

DES-CFB Digital Encryption Standard – Cipher
Feedback

DES-OFB Digital Encryption Standard – Output
Feedback

DES-XL Digital Encryption Standard – Counter Ad-
dressing

DIU Digital Interface Unit

E

EEPROM Electrically Erasable Programmable Read-
Only Memory

F

FIPS Federal Information Processing Standard

I

IMBE	Improved Multi Band Excitation (coding)
I/O	Input/Output

K

KEK	Key Encryption Key
KID	Key ID
KLK	Key Loss Key
KMC	Key Management Controller
KMF	Key Management Facility
KMM	Key Management Messages
KVL	Key Variable Loader

L

LCD	Liquid Crystal Display
LED	Light Emitting Diode
LID	Logical ID

M

MNP	Message Number Period
------------	-----------------------

O

OTAR	Over-the-Air Rekeying
-------------	-----------------------

P

PCMCIA Personal Computer Memory Card International Association

R

RAM Random Access Memory

RF Radio Frequency

RNC Radio Network Controller

RSI Radio Set Identifier

RSS Radio Service Software

T

TEK Traffic Encryption Key

U

USK Unique Shadow Key

UKEK Unique Key Encryption Key

V

VSELP Vector Sum Excited Linear Predictor

Notes ...

Appendix B Performance Specifications

Appendix B Performance Specifications

Physical

Dimensions	226 mm Long (includes Connector Boot) 89 mm Wide 48 mm Thick (High Capacity Battery Included)
Weight	714 g (High Capacity Battery Included)

Encryption

Supported Encryption Applications	DES-CFB DES-XL DES-OFB DVP DVP-XL DVI-XL
Supported Encryption Protocols	12 kbps <i>SECURENET</i> 9.6 kbps Secure <i>ASTRO</i> (VSELP Vocoder) 9.6 kbps Secure APCO Project 25 (IMBE Vocoder)
Encryption Keys	1,024 Total Traffic and Shadow Keys
Standards	FIPS 46-2 FIPS 81 FIPS 140-1

User Interface

Four Line, 12 Character (4x12) LCD Display
LCD Annunciator Line
4x4 Numeric Key Pad (0-9 and A-F Keys)
Two General Purpose Softkeys
Scroll Left/Increment Key
Scroll Right/Decrement Key
Power On/Off, Delete/Shift, Enter Keys
DB-9 Connector (RS232)
Type II PCMCIA slot
Infrared Transceiver
Keyload Port

Regulatory Compliance and Approvals

Safety	EN 60950
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Electromagnetic Compatibility

CISPR 22 Class B
European EMC Directive 89/336 EEC
EN 50081 – 1 Class B
EN 50082 – 2
EN 55022 Class B
IEC 801.2, IEC 801.3, IEC 801.4
FCC Part 15 Subpart B*
* This device is verified to comply with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Environmental Testing

Standard	Method	Procedure	Test	Performance
MIL – STD 810E	510.3	I	Blowing Dust	Meets or exceeds published specs following blowing dust testing.
MIL – STD 810E	509.3	I	Salt Fog	Meets or exceeds published specs following salt fog testing.
MIL – STD 810E	516.4	I	Shock	Meets or exceeds published specs following shock testing.
MIL – STD 810E	505.3	I	Solar Radiation	Meets or exceeds published specs following solar radiation testing.
MIL – STD 810E	514.4	I	Vibration	Meets or exceeds published specs following vibration testing.
Operating Temperature				–30° to +60° Celsius except PCMCIA Card (which is 0° to +60° Celsius)
Storage Temperature				–55° to +85° Celsius

Appendix C Models and Options

Appendix C Models and Options

Model Complement for T5795A KVL 3000

Item	Description
CLN6738	KVL 3000 Main Circuit Board
CLN7051	4 x 12 LCD Display
CLN7064	Chassis
CLN7063	Housing Assembly
CLN6985	Hardware
CLN7135	Nameplate
CNN6002	Battery
NTN7395	High Capacity Ni-Cad Battery
CBN6134	Packing
0782113Y01	KVL Bracket Stand
68P81130E08	KVL 3000 User's Guide

Battery Accessories

Item	Description
NTN1308	120 Volt Rapid Rate Dual Unit Charger
NTN7621	120 Volt Rapid Rate Multi Unit Charger
NTN1403	220 Volt Rapid Rate Multi Unit Charger
NTN1404	240 Volt Rapid Rate Multi Unit Charger
NTN7395	High Capacity Nickel Cadmium Battery

Interface Cables

Kit	Option	Description
TDN9390	C724	MTS 2000™, XTS 3000™
TKN8209	C540	MTX300S and STX Series
TKN8210	C541	MICOR™ mobile and base, portable repeater
TKN8229	C542	Series II CIU, SYNTOR™, SYNTOR X™, MCX 1000™, PX300–S™, KMC
TKN8506	C544	Saber™, ASTRO Saber™
TKN8531	C543	MSF 5000, DIU, DIU 3000, Expo, SYNTOR X 9000™ Series, RNC, SPECTRA™, ASTRO SPECTRA™ (requires TRN7414)
TKN9152	C551	MCS 2000™
TRN7414	n/a	Cable Adapter for SPECTRA™ and ASTRO SPECTRA™
CKN6324	n/a	KVL 3000 DB-9/Modem Cable
n/a	C954	Cables for SPECTRA™ and ASTRO SPECTRA™ (includes cable and adapter)

FLASHport™ Upgrades

The following upgrade models and options are available as *FLASHport* software upgrades for the *KVL 3000*. The upgrades are provided on a PCMCIA card that may be inserted into the PCMCIA slot in the top of the *KVL 3000* and installed by following the instructions accompanying the upgrade package.

Note In the following tables, the term *non-DES* refers to KVLs that are not equipped with the DES encryption algorithm (i.e., only equipped with DVI-XL, DVP-XL, or DVP).

For existing non-ASTRO 25 and non-DES KVLs :

Desired Upgrade	Required Model/Options
To obtain most current KVL Operating Software (non-ASTRO 25, non-DES)	Model N1797 with Option U224
To add DES encryption and obtain most current KVL Operating Software	Model N1796 with Option U225
To add ASTRO 25 and obtain most current KVL Operating Software	Model N1797 with Option U239
To add DES encryption, ASTRO 25, and obtain most current KVL Operating Software	Model N1796 with Options U225 and U239

For existing non-ASTRO 25 KVLs equipped with DES:

Desired Upgrade	Required Model/Options
To obtain most current KVL Operating Software (non-ASTRO 25, with DES)	Model N1796 with Option U224
To add ASTRO 25 and obtain most current KVL Operating Software	Model N1796 with Option U239

For existing ASTRO 25 and non-DES KVLs:

Desired Upgrade	Required Model/Options
To obtain most current KVL Operating Software (ASTRO 25, non-DES)	Model N1797 with Option CA00058
To add DES encryption and obtain most current KVL Operating Software	Model N1796 with Options CA00058 and U225

For existing ASTRO 25 KVLs with DES:

Desired Upgrade	Required Model/Options
To obtain most current KVL Operating Software (ASTRO 25, with DES)	Model N1796 with Option CA00058

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